Amendment 27 to the Pacific Coast Groundfish Fishery Management Plan and 2017-2018 Harvest Specifications and Management Measures

Environmental Assessment- Draft

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A Amendment 27, excerpts of modified FMP text.

B New management measures detailed analysis.

Acronym List

A-SHOP	At-Sea Hake Observer Program
ABC	Acceptable biological catch
ACL	Annual catch limit
BiOp	Biological opinion
BRT	Biological Review Team
CDFW	California Department of Fish and Wildlife
CEQ	Council on Environmental Quality
C/P	Catcher/processor
C/PUE	Catch per unit of effort
Council	Pacific Fishery Management Council
CV	Coefficient of variation
DPS	Distinct population segment
EA	Environmental Assessment
EC	Ecosystem component
EEZ	Exclusive Economic Zone
EFH	Essential fish habitat
EFP	Exempted fishing permit
EM	Electronic monitoring
ESA	Endangered Species Act
fm	Fathom
FMP	Fishery Management Plan
F_{MSY}	Fishing mortality rate that maximizes catch biomass in the long term
GMT	Growth Management Team
HCRs	Harvest control rules
HG	Harvest guideline
IFQ	Individual fishing quota
ITS	Incidental take statement
LE	Limited entry
m	Meter
MMPA	Marine Mammal Protection Act
mt	Metric ton
MS	Mothership
MSA	Magnuson-Stevens Fisheries Conservation and Management Act
MSCV	Mother ship catcher vessel
MSY	Maximum sustainable yield
NEPA	National Environmental Policy Plan
NWFSC	Northwest Fisheries Science Committee
OA	Open access
OFLs	Overfishing limits
OFS	Overfished species
OY	Optimum yield
P*	probability of overfishing
PCGFMP	Pacific Coast Groundfish Fishery Management Plan
POP	Pacific Ocean perch

Acronym List (continued)

QP	Quota pounds
QS	Quota shares
RCA	Rockfish Conservation Area
RIR	Regulatory Impact Review
SAFE	Stock Assessment and Fishery Evaluation
SPR	Spawning potential ratio
SSB	Spawning stock biomass
SSC	Scientific and Statistical Committee
TAC	Total allowable catch
2015 EIS	Harvest Specifications and Management Measures for 2015-2016 and Biennial Periods Thereafter Final Environmental Impact Statement
T_{TARGET}	Target year
U.S.	United States
USFWS	U.S. Fish and Wildlife Service
VMS	Vessel monitoring system
WCGOP	West Coast Groundfish Observer Program
YRCA	Yelloweye Rockfish Conservation Area

1.0 INTRODUCTION

This chapter establishes the framework for the proposed action and its purpose and need. This Environmental Assessment (EA) is a tiered analysis from the "Harvest Specifications and Management Measures for 2015-2016 and Biennial Periods Thereafter Final Environmental Impact Statement" (referred to as "the 2015 EIS" in text). As stated in the 2015 EIS, the adoption and adjustment of regulations for managing the groundfish fishery (including harvest specifications and management measures) are an ongoing, adaptive process. Changes in the type and intensity of environmental impacts tend not to differ substantially from one two-year period to the next. With this view in mind, the 2015 EIS evaluated the impacts of the ongoing biennial harvest specifications and management measures action over a longer period than two years. Future, biennial changes to the management program may subsequently be evaluated in more focused analyses, based on Council on Environmental Quality (CEQ) guidelines for supplementing and/or tiering from a previously prepared National Environmental Policy Act (NEPA) document. As such, NMFS has prepared this tiered EA in accordance with the CEQ's Regulations (Section 1502.20), the Environmental Review Procedures for Implementing the National Environmental Policy Act (NOAA Administrative Order 216-6, Section 4.01), and the 2015 Final EIS.

Because this action is the next biennial cycle (i.e., the 2017-2018 harvest specifications and management measures) after the 2015 EIS, the 2015 EIS is incorporated by reference. Further, because some of the harvest specifications and management measures recommended by the Pacific Fishery Management Council (Council) for 2017-2018 are within the range of the 2015 EIS harvest specifications and management measures and impacts in the 2015 EIS, this EA does not include the full suite of harvest specifications and management measures recommended by the Council. This EA only includes updated information and analysis of the harvest specifications and management measures that have been proposed since the 2015 EIS and those for which the impacts were not included in the 2015 EIS (i.e., new management measures or harvest specifications and anticipated impacts outside the range evaluated). The 2015 EIS can be found at the following website address: **http://www.westcoast.fisheries.noaa.gov/publications/nepa/groundfish/groundfish_nepa_documents.html.**

1.1 Background of this Proposed Action

The 2017-2018 harvest specification cycle is the first since Amendment 24 to the Pacific Coast Groundfish Fishery Management Plan (PCGFMP), which established default harvest control rules (HCRs) for the species managed in the FMP, evaluated ten-year projections for harvest specifications, and

routinely adjusted management measures. Amendment 24 resulted in a streamlined Council decision-making process for the 2017-2018 biennial cycle.

This section provides a summary of Amendment 24 and the operation of the default HCRs, as well as the proposed action and the purpose and need statement (sections 1.4 and 1.5). The use of default HCRs and their addition to the FMP was intended to simplify the Council's harvest specifications process and acknowledge that the Council generally maintains the policy choices from the previous biennium to determine the harvest specifications for the next biennium. Under Amendment 24, HCRs used to determine the previous biennium's harvest specifications (i.e., overfishing limits [OFLs], acceptable biological catch [ABC], and annual catch limits [ACLs]) would automatically be applied to the best scientific information available to determine the future biennium's harvest specifications. NMFS would implement harvest specifications based on the default HCRs, unless the Council made a different recommendation.

In addition to the use of defaults to simplify the harvest specifications process, Amendment 24 changed the description of the type of management measures that could be addressed through the biennial process. Amendment 24 clarified that the management measures should be 1) management measures that would be classified as routine the first time these measures were used, 2) adjustments to current management measures that are classified as routine, and 3) new management measures that had not previously been analyzed. This clarified the focus of management measures by simplifying those the Council proposed through each biennial cycle. Therefore, the full suite of Council recommendations for the 2017-2018 biennium would implement the default harvest specifications for most stocks. Because the impacts were analyzed in the 2015 EIS, they are not discussed in this document.

1.2 Determining Harvest Specifications and Management Measures

The biennial harvest specifications and management measures process evaluates two types of major components: 1) harvest specifications and 2) management measures. For a detailed description of how harvest specifications are calculated, see Chapter 2.1 in the 2015 EIS.

The Council considers harvest specifications, including OFLs, ABCs, and ACLs for groundfish stocks (and related management units[1]), consistent with the policies and procedures it has established in

[1] Management units are stocks occurring throughout the West Coast Exclusive Economic Zone (EEZ coastwide), geographic subdivisions of stocks in the EEZ, and geographically subdivided stock complexes composed of more than one managed species.

the PCGFMP for these actions and in compliance with applicable law. For management measures, the Council considers adjustment to routine measures and the implementation of new management measures.

Section 6.2 in the PCGFMP describes procedures for establishing management measures as part of the biennial management cycle. As part of this process, new management measures may be established in regulations and classified as routine. Once classified as routine, management measures may be adjusted, and associated regulations may be revised through an abbreviated rulemaking process. Through Amendment 24 to the PCGFMP, new management measures were defined as those management measures where the impacts have not been previously analyzed and/or have not been previously implemented in regulations. All measures are "new" when first proposed. The need, impacts, and rationale for a new measure must be analyzed, and the new measure must be implemented through full rulemaking before it can then be classified as routine.

1.3 Harvest Specifications and Management Measures

In accordance with the Magnuson-Stevens Fishery Conservation and Management Act (MSA), NMFS' proposed actions consist of the following:

(1) The adoption of 2017/2018 harvest specifications and new management measures

(2) A decision on the proposed FMP Amendment to change a stock classification and implement other management measures

Only four species' harvest specifications and new management measures are examined in this EA. As stated above, the proposed action includes setting harvest specifications for big skate, widow rockfish, darkblotched rockfish, and Pacific ocean perch (POP), establishing new management measures for the 2017-2018 biennial period and beyond, revising Federal regulations at 50 CFR 660, Subparts C through G, accordingly, and implementing Amendment 27 to the PCGFMP.

For 2017-2018, default HCRs from the previous biennial period (in this case, 2015-2016) were used to calculate Alternative 1 (No Action Alternative) harvest specifications. Modifications to the default HCR are proposed under Alternative 2 (the Preferred Alternative) to address new science, changes in stock status, and an emerging bycatch issue, which is explained further below. As stated above in section 1.1, HCRs are the various rules and definitions used to establish OFLs, ABC, ACLs, and annual catch targets, where applicable. Management measures are designed to achieve the harvest specifications (ACLs or fishery harvest guidelines [HGs]). For 2017-2018, the HCRs from the previous biennial period were used,

combined with the best available scientific information (such as the most recent stock assessment), to calculate harvest specifications.

The Council developed the management measures in collaboration with NMFS. This EA also provides an analysis of a range of Pacific whiting total allowable catches (TACs) that are not part of the proposed action, but which will be implemented early in 2017. The sections below describe Amendment 27 to the PCGFMP, the proposed action, and the purpose and need.

1.4 Amendment 27 to the PCGFMP

In addition to adopting harvest specifications and management measures, the proposed action includes amending the PCGFMP to change a stock classification and implement other management measures beyond the scope of the PCGFMP framework for regulatory adjustments. To implement these changes, the PCGFMP must be amended. These actions include the following:

- Categorize big skate (*Raja binoculata*) as a management unit species "in the fishery" (50 CFR 600.310(d)) instead of an ecosystem component (EC) species. New information shows that the stock is being targeted, and an EC designation is no longer appropriate. The PCGFMP must be amended to accomplish this change.
- Describe a new inseason process for actions taken outside of a Council meeting regarding canary, yelloweye, and black rockfish in California.
- Add deacon rockfish to the list of actively managed species in the PCGFMP; list it as blue/deacon because the species cannot be differentiated.
- Update Appendix F based on rebuilt species and updated stock information for overfished species.
- Make minor clarifications to Chapter 4 describing various stock assessment types.

These actions are proposed to prevent overfishing, to rebuild overfished stocks, to ensure conservation, to facilitate long-term protection of essential fish habitat (EFH), and to realize the full potential of the nation's fishery resources (MSA §2(a)(6)). These actions are needed to respond to new scientific information and information about the needs of fishing communities, to provide additional tools to ensure that ACLs and other federal harvest guidelines are not exceeded, and to afford additional fishing opportunities where warranted.

1.5 Level of NEPA Analysis

To evaluate the level of NEPA analysis needed for the 2017-2018 harvest specifications and management measures, NMFS examined whether the 2017-2018 harvest specifications and routine management measure adjustments proposed by the Council and their anticipated impacts were within the range of impacts described in the long-term analysis established in the 2015 EIS. If a harvest specification or management measure adjustment was within the previously analyzed range, and the anticipated impacts were covered in the 2015 EIS, then NMFS determined it would not need further NEPA analysis for 2017-2018. If the harvest specification or management was determined not to be within the analyzed range, or if the impacts had not been analyzed, NMFS evaluated the appropriate level of additional NEPA analysis needed. All of the routine management measure adjustments (i.e., modifications to commercial and recreational trip limits, bag limits, and season dates) and their anticipated impacts for 2017-2018 were determined to be within the range analyzed in the 2015 EIS action. Four proposed harvest specifications were determined to need further NEPA analysis because the proposed 2017-2018 harvest specifications for these species were outside of the range of possible harvest specifications analyzed in the 2015 EIS, and the impacts of the changes were not analyzed in the 2015 EIS. The new preferred management measures were also determined to need further NEPA analysis because they have not been implemented previously.

1.6 Description of Management Area

The management area for this action is the same as in the 2015 EIS. See the 2015 EIS for a description of the management area.

2.0 DESCRIPTION OF ALTERNATIVES

As previously described, all of the routine management measure adjustments and their anticipated impacts in the 2017-2018 biennium were determined to be within the range of impacts analyzed in the 2015 EIS. Four harvest specification alternative actions were determined to need further NEPA analysis, in addition to all of the new management measures.

The four proposed harvest specifications needing further NEPA analysis are as follows:

1. Harvest specifications resulting from reclassification of big skate
2. Widow rockfish increased ACLs
3. Darkblotched rockfish harvest control rule adjustments and resulting harvest specifications
4. POP harvest control rule adjustments and resulting harvest specifications

The new management measures needing further NEPA analysis are as follows:

1. Management measures resulting from classification of big skate as "in the fishery"
2. Flatfish retention during seasonal depth closures in Oregon
3. New inseason process for California recreational and commercial fisheries
4. Petrale sole and starry flounder retention in the California recreational fishery

2.1 Description of the Harvest Specifications Alternatives

With the adoption of Amendment 24 to the PCGFMP in February 2015, the Council and NMFS established default HCRs. Unless modified by the Council and approved by NMFS, the default HCRs are used to establish biennial harvest specifications for stocks and stock complexes each biennium.

The Council and NMFS considered alternatives to the default HCRs for several stocks to address various concerns. However, only four of the species' harvest specifications fell outside of the analyzed impacts and/or default HCRs in the 2015 EIS and are included in this EA. The basis for the harvest specification alternatives is as follows:

- Big skate is currently managed as an EC species with no harvest specifications. An alternative HCR of ACL=ABC (probability of overfishing [P*]=0.45) is being considered if the stock is designated for active management. This would be a change in the default HCR for big skate.
- Widow rockfish is currently managed under a constant-catch HCR of 2,000 metric tons (mt). An alternative HCR of ACL=ABC (P*=0.45), the default for rebuilt stocks, is being

considered. The resulting harvest specifications are outside the range of those analyzed in the 2015 EIS, and they would change the default HCR for widow rockfish.

- Darkblotched rockfish is currently managed under a rebuilding plan with a spawning potential ratio (SPR) harvest rate of 64.9 percent. An alternative HCR of ACL=ABC (P*=0.45), the default for rebuilt stocks, is being considered because darkblotched rockfish is projected to be rebuilt by the start of 2016. The stock has not been declared rebuilt at this time; this would change the default HCR for darkblotched rockfish.
- POP is currently managed under a rebuilding plan with an SPR harvest rate of 86.4 percent. An alternative HCR of constant ACLs of 281 mt in 2017/2018 is being considered. This would change the default HCR for 2017-2018. The POP HCR would return to the 2016 HCR in 2019.

2.1.1 Alternative 1 (No Action Alternative)

The 2017 and 2018 harvest specifications under Alternative 1 are provided in Agenda Item G.4, Attachment 3, June 2016 (Table 2-1). Harvest specifications based on default HCRs would be considered no action because there would not be a departure from the current harvest management policies under the harvest specification framework described in Chapter 4 of the PCGFMP. Default harvest specifications would reflect the application of the best available science to the default HCRs.

Table 2-1. 2017 and 2018 harvest specifications OFLs (in meters [m0), ABCs (in mt), and ACLs (in mt), for West Coast groundfish stocks and stock complexes under default harvest control rules. Stocks with new assessments are in bold.

Stock or Stock Complex	2017			2018			Default Harvest Control Rules
	OFL	ABC	ACL	OFL	ABC	ACL	
Big skate	NA	NA	NA	NA	NA	NA	EC Species (i.e., no harvest control rules or specifications)
Widow rockfish	**14,130**	**13,508**	**2,000**	**14,511**	**13,873**	**2,000**	**ABC (P* = 0.45), ACL = 2,000 mt annually**
Darkblotched rockfish	671	641	406	693	663	419	ABC (P*=0.45), ACL (SPR = 64.9%)
POP	964	922	171	981	938	176	Updated projections from 2011 rebuilding analysis using actual catches from 2011 to 2014 and assumed ACL removals thereafter. ABC (P* = 0.45), ACL (SPR = 86.4%)
Pacific whiting[2]	--	--	--	--	--	--	--

OFL means overfishing limit.

The reasons for changes in default HCRs within the scope of the PCGFMP policy framework and stock classifications are summarized below.

[2] The Pacific whiting harvest specifications are established consistent with the U.S. Canada Pacific Whiting Treaty.

Big skate is currently designated as an EC species, so there is no default HCR, nor are there related default harvest specifications for this stock. Under Alternative 1, the stock would continue to be managed as an EC species with no harvest specifications.

The Alternative 1 ACL for widow rockfish would be a constant catch ACL of 2,000 mt. The 2017-2018 OFL and ABC values are from the 2015 new full assessment of widow rockfish (Hicks and Wetzel 2015).

Alternative 1 for darkblotched rockfish would be management under a rebuilding plan. A prescribed SPR of 64.9 percent to determine ACLs would be applied.

Alternative 1 for POP would be management under a rebuilding plan. A prescribed SPR of 86.4 percent would be applied to determine ACLs.

2.1.2 Alternative 2 (Preferred Alternative)

Alternative 2 would establish new default harvest control rules for big skate, widow rockfish, and darkblotched rockfish, as well as a new two-year HCR for POP. Alternative 2 is shown in Table 2-2. The changes from Alternative 1 are as follows:

- Big skate. Should Amendment 27 be approved and big skate be designated as a species "in the fishery," the preferred specification alternative would apply a stock-specific HCR of ACL = ABC under a P* of 0.45. This is the default HCR established by the Council for healthy stocks when the biomass target is above maximum sustainable yield (MSY).
- Widow rockfish. The HCR for widow rockfish would be ACL = ABC under a P* of 0.45; this action would remove the 2,000-mt annual constant-catch ACL. These harvest specifications were determined based on the 2015 widow rockfish assessment (Hicks and Wetzel 2015), which estimated the stock to be at 75.1 percent depletion. The 2,000-mt constant catch ACL was previously needed to address uncertainty in the 2011 assessment. The 2015 assessment results indicated a more certain and optimistic perception of current stock depletion. Therefore, the risk of changing the default HCR to the highest allowed in the FMP would likely be low with a predicted depletion of 56 percent in 2026. This would result in increased 2017-2018 ACLs of 13, 508mt and 12,655 mt.
- The preferred HCR for darkblotched rockfish would be ACL = ABC under a P* of 0.45, in response to the prediction by Gertseva et al. (2015) that the stock would be rebuilt by

the start of 2016. This would result in an increase in the ACLs for 2017-2018 to 641 mt and 653 mt.

- The preferred HCR for POP would depart from the default HCR in the current rebuilding plan for the next two years by specifying a 281-mt ACL in 2017 and 2018 and by specifying that the 2016 rebuilding plan HCR (SPR = 86.4 percent) would apply in 2019 and thereafter. This would result in an increased ACL of 281 mt in both 2017 and 2018.

A range of possible Pacific whiting TACs is described in Chapter 4.

Table 2-2. Alternative 2 2017 and 2018 harvest specifications OFLs (in mt), ABCs (in mt), and ACLs (in mt), for select West Coast groundfish stocks. Stocks with new assessments are in bold.

Stock	2017			2018			ACL Basis
	OFL	ABC	ACL	OFL	ABC	ACL	
Big skate	541	494	494	541	494	494	ACL= ABC (P* = 0.45)
Widow rockfish	**14,130**	**13,508**	**13,508**	**13,237**	**12,655**	**12,655**	**ACL = ABC (P* = 0.45)**
Darkblotched rockfish	**671**	**641**	**641**	**683**	**653**	**653**	**ACL = ABC (P* = 0.45)**
POP	964	922	281	981	938	281	ABC (P* = 0.45), Constant catch ACL = 281

2.1.2.1 Big Skate

Big skate is currently designated as an EC species, so there is no default HCR and related default harvest specifications for this stock. The preferred harvest specifications would apply a stock-specific HCR of ACL equal to the ABC under a P* of 0.45 (Table 2-2), which is consistent with the Council's default HCR for healthy stocks managed under the PCGFMP. This would result in an ACL of 494 mt in 2017 and 2018.

2.1.2.2 Widow Rockfish

The 2015 widow rockfish assessment (Hicks and Wetzel 2015) estimated the stock to be at 75.1 percent depletion. Because the stock is above the MSY biomass target of 40 percent depletion, the preferred HCR for widow rockfish would be ACL = ABC under a P* of 0.45. This would establish a new default HCR for widow rockfish consistent with the Council's default HCR used for healthy stocks managed under the PCGFMP. The preferred ACLs for 2017-2018 would increase from 2000 mt to 13,508 mt in 2017 and 12,655 mt in 2018.

2.1.2.3 Darkblotched Rockfish

The 2015 darkblotched rockfish assessment (Gertseva et al. 2015) estimated a spawning stock depletion of 39.3 percent at the start of 2015, which is just under the target biomass depletion ratio of 40 percent of

unfished biomass (when an overfished stock is declared rebuilt), and projected that the stock would be rebuilt by the start of 2016. Therefore, the proposed HCR for darkblotched rockfish would be ACL = ABC under a P* of 0.45. This would establish a new default HCR for darkblotched rockfish consistent with the Council's default HCR used for healthy stocks managed under the PCGFMP. The preferred ACLs for 2017-2018 would increase from 419 mt to 641 mt in 2017 and would be 653 mt in 2018.

2.1.2.4 Pacific Ocean Perch

POP was last assessed in 2011. For the 2017-2018 biennium, the rebuilding analysis completed for the 2015-2016 biennium was updated with actual catches from 2011 to 2014. To address an emerging bycatch issue, the preferred harvest specifications would be based on a two-year departure from the current default HCR (SPR=86.4 percent) in the POP rebuilding plan, with a return the 2016 default starting in 2019. Therefore, the proposed 2017-2018 HCR for POP would be a constant catch of 281 mt. The preferred ACL would be an increase of 176 mt from the current ACL.

2.2 Description of New Management Measure Alternatives

Management measures considered as part of the biennial process fall into the following three broad categories: 1) adjustments to and allocations of ACLs; 2) adjustments to existing management measures, including those designated as routine; and 3) adoption of new management measures. As stated in Chapter 1, NMFS determined that the allocations and adjustments to existing and routine management measures were within the range of management measures analyzed in the 2015 EIS. Therefore, the impacts of those adjustments have been analyzed, and they are not included in this document. Analyses of the adjustments to and allocations of ACLs and adjustment to existing management measures, including those designated as routine, were presented to the Council at the November 2015 through June 2016 meetings. These analyses can be found on the Council's website within each meeting's briefing book (http://www.pcouncil.org/council-operations/briefing-books/).

A detailed evaluation of the performance and effects of the new management measures that would be implemented beginning in 2017-2018 and carried forward into the future can be found in Appendix B. Alternative 1 and the new management measures are addressed in the subsections below.

2.2.1 Classification of Big Skate in the Fishery Management Plan

The sections below outline the alternative actions. They cover the actions proposed for big skate.

2.2.1.1 Alternative 1 (No Action Alternative)

Under Alternative 1, big skate would remain an EC species. It would not have a species-specific harvest specification, but it would have a sorting requirement and trip limits for the Shorebased IFQ sector.

2.2.1.2 Alternative 2 (Preferred Alternative)

NMFS approved the EC designation of big skate through Amendment 24 to the PCGFMP. However, when the Council considered designating all skates except longnose skate as EC species in Amendment 24, the Growth Management Team (GMT) estimated that catches of big skate averaged 95 mt from 2007 to 2011 with large landings of Unspecified Skate (Table 4-33 in the 2015 EIS). Subsequent analysis of Oregon port sampling data not available when the Council considered the EC designation indicated that approximately 98 percent of the recent Unspecified Skate landings in Oregon consisted of big skate. The GMT revised the total mortality estimates of big skate coastwide using these new data (Table 1-10, Pacific Coast Groundfish Fishery Stock Assessment and Fishery Evaluation [SAFE], Council 2016). Such large landings indicated that targeting of big skate had occurred, and an EC designation was not warranted.

Therefore, the preferred management measure alternatives would continue the 2016 big skate trip limits for the Shorebased IFQ sector. The management measures would also expand the sorting requirement from only the Shorebased IFQ sector to all commercial groundfish sectors to track landings and mortality against the new harvest specifications in 2017-2018.

2.2.2 Oregon Recreational Flatfish Fishery

The sections below outline the alternative actions. They cover the actions proposed for flatfish.

2.2.2.1 Alternative 1 (No Action Alternative)

Under Alternative 1, recreational fishing in Oregon would be allowed year-round with several depth-based closures that would restrict the allowable fishing areas. No flatfish species retention would be allowed in the Oregon recreational fishery seaward of the 40-fathom (fm) boundary line from April 1 through September 30. From January 1 through December 31, flatfish retention would be allowed in the Oregon recreational fishery with a 25-fish limit per day for all flatfish, excluding Pacific halibut, but including all soles, flounders, and Pacific sanddabs.

2.2.2.2 Alternative 2 (Preferred Alternative)

This management measure would allow the targeting of flatfish species, other than Pacific halibut, seaward of the 40-fm closure from April 1 through September 30 (i.e., the seasonal depth restriction in the

Oregon recreational groundfish fishery). This measure has been included in previous EISs; however, it has not been implemented as it has been intended primarily to be an alternative opportunity should the main recreational groundfish fishery be closed. For 2017 and beyond, this measure would be in regulation, but it would not be applied unless the Council took action to propose that this measure be implemented by NMFS through routine inseason action. The Council and NMFS use this same procedure for area closures, allowing inseason tools to be analyzed, defined in regulation, but implemented through routine inseason action only if needed.

This EA supplements the previous analysis. It includes this approach as a proposed new management measure in this cycle.

2.2.3 New Inseason Process for California Recreational and Commercial Fisheries

The sections below outline the alternative actions. They cover the actions proposed for recreational and commercial fisheries for black rockfish, canary rockfish, and yelloweye rockfish.

2.2.3.1 Alternative 1 (No Action Alternative)

Under Alternative 1, NMFS could implement inseason changes to commercial and recreational fisheries only after the Council took action at a meeting, consistent with the current regulations and the FMP. No changes to routine management measures would be allowed outside of a Council meeting.

2.2.3.2 Alternative 2 (Preferred Alternative)

This management measure would grant NMFS the authority to make routine inseason adjustments to restrict recreational and commercial fisheries in California outside of a Council meeting based on the catch of black rockfish, canary rockfish, and yelloweye rockfish. Adjustments could be made to restrict the catch of black rockfish, canary rockfish, and yelloweye rockfish for fisheries that occur in the waters off California.

For commercial fisheries for black rockfish, adjustments would be limited to 1) trip landing and frequency limits and 2) depth-based management measures. For recreational fisheries, adjustments would be limited to 1) bag limits, 2) time/area closures, and 3) depth-based management. Adjustments would be used to restrict catch of black rockfish, canary rockfish, and yelloweye rockfish and would be based on attainment or projected attainment of California state-specific Federal harvest specifications prior to the start of the next Council meeting. The following harvest specifications would apply: canary and yelloweye rockfish each have a California state-specific Federal harvest guideline. For black rockfish, a California statewide ACL is shared between the commercial and recreational fisheries.

Any actions implemented based on attainment or projected attainment of the HGs for canary rockfish or yelloweye rockfish would apply to the recreational fishery. Black rockfish is currently managed under a statewide ACL, which is shared between the commercial and recreational fisheries (i.e., there are no sector-specific HGs). Therefore, inseason action would be triggered based on attainment or projected attainment of the statewide black rockfish ACL, and actions could apply to the recreational and/or commercial fisheries. The stocks that would trigger action are black rockfish, canary rockfish, and yelloweye rockfish; however, the resulting inseason action might affect other species. Attainment or projected attainment of specified harvest limits would be based on inseason monitoring and tracking used by the California Department of Fish and Wildlife (CDFW) (Appendix A).

In this new inseason process, CDFW would continue to track mortality in-season and would consult with NMFS and Council staff on the progress of fisheries, including how catches of black rockfish, canary rockfish, and yelloweye rockfish were tracking in California. The first consultation would occur after the June Council meeting. If CDFW projections indicated that mortality of an aforementioned species could approach a specified harvest limit, more frequent consultations could occur.

Once a specified harvest limit was projected to be attained, or if the harvest limit was attained before the start of the next Council meeting, CDFW would consider the suite of routine actions best suited to keep mortality within allowable limits. Such actions might include reductions in trip limits, bag limits, allowable depth, area closures, and fishery closures in the affected sector(s), which may vary by management area. Through consultation with NMFS and Council staff, CDFW would provide NMFS with recommendations regarding the action(s) to be taken.

Any modifications would be effective upon publication in the Federal Register. Generally, opportunity for public notice and comment is waived under the Administrative Procedures Act for routine inseason actions, as they may go into effect after a single Federal Register notice. NMFS would implement any such modifications pursuant to the existing inseason action process established under the FMP.

2.2.4 Petrale Sole and Starry Flounder Season in California Recreational Fishery

The sections below outline the alternative actions. They cover the actions proposed for recreational and commercial fisheries for petrale sole and starry flounder.

2.2.4.1 Alternative 1 (No Action Alternative)

Under Alternative 1, retention of petrale sole and starry flounder would be prohibited in the California recreational fishery during the recreational season and depth closures. Both species are currently managed

coastwide as single stocks. Under Amendment 21, petrale sole and starry flounder were allocated between trawl and non-trawl sectors. The non-trawl allocations for both stocks have not been divided among the commercial non-trawl and recreational sectors.

2.2.4.2 Alternative 2 (Preferred Alternative)

This management measure would allow retention of petrale sole and starry flounder during seasons and in areas that are closed to recreational groundfish fishing, in California only, by exempting these species from the season and depth restrictions in the California recreational groundfish fishery. Currently, retention of petrale sole and starry flounder is permitted only during the open months and at allowable depths in the recreational groundfish fishery. The open months and allowable depths vary by management area. See the Council's integrated alternatives document for the recreational season structure (Agenda Item G.4, Attachment 2, June 2016).

2.2.5 Deduction from the Annual Catch Limit to Account for Unforeseen Catch Events (The Buffer)

The sections below outline the alternative actions. They cover the actions proposed to account for groundfish mortality.

2.2.5.1 Alternative 1 (No Action Alternative)

Deductions from most groundfish ACLs, called off-the-top deductions, are made to account for groundfish mortality in the Pacific Coast treaty Indian tribal fisheries, scientific research, non-groundfish target fisheries (hereinafter incidental open access fisheries), and, as necessary, exempted fishing permits (EFPs). Sufficient yield must be available to accommodate the anticipated groundfish mortality from the aforementioned activities to increase the probability that catches will remain at or below the ACLs.

Amounts deducted from the ACL to accommodate groundfish mortality from scientific research, incidental open-access fisheries, and EFPs can be modified inseason based on the best available information. The amount estimated to go unharvested can be reapportioned back to the groundfish fishery according to sector needs. The reapportionment could be done through an inseason action published in the Federal Register following a Council meeting. At a Council meeting, the Council would review the off-the-top deductions from the ACL and recommend full reapportionment, partial reappointment, or no reapportionment to NMFS, based on the allocation framework criteria and objectives outlined in the FMP, as well as managing the risk of exceeding an ACL. The specified amount of groundfish would be reapportioned in proportion to the original allocations for the calendar year, modified to account for Council recommendations with respect to sector needs. Reapportionment would be based on best

available information, but would most likely occur later in the year after the September or November Council meetings.

2.2.5.2 Alternative 2 (Preferred Alternative)

This management measure has two components. First, this measure would add a new category of yield to the off-the-top deductions to account for unforeseen catch events. This category would then be available for use in future bienniums for any species, and the amounts deducted would be available for distribution through routine inseason action. Any amounts established to account for unforeseen catch events would have to be established through the biennial harvest specifications and could not be established inseason because they would be deducted off the top of the ACL prior to allocations, meaning any inseason modifications would cause changes to allocations, which are unavailable as inseason actions. Once established, the amounts would be available for distribution through routine inseason actions, identical to the other deductions described under Alternative 1. Second, this measure would specifically establish 2017-2018 deductions for canary rockfish (188 mt in 2017 and 0 mt in 2018), darkblotched rockfish (50 mt in 2017/2018), and POP (25 mt in 2017/2018).

There would be no deduction for canary rockfish in 2018 because the Council wants to maintain a constant fishery HG (the amount available after the off-the-top deductions), Due to a decrease in the canary ACL from 2017 to 2018, there would be no amount available to maintain the 2017 fishery HG. When determining whether to release the buffer, the Council would consider the same allocation criteria outlined in the FMP as under Alternative 1, because this measure would not alter the criteria.

2.3 Alternatives Considered, but Rejected from Further Analysis

The Council considered several new management measures described in this section, but the measures were rejected for implementation in 2017-2018. Descriptions of the management measures are provided below, and detailed analyses can be found in Appendix B.

2.3.1 Managing Starry Flounder as Part of the Other Flatfish Complex

The United States (U.S.) West Coast starry flounder stock was assessed in 2005 (Ralston 2006). The assessment was based on the assumption of separate biological populations north and south of the California-Oregon border. Unlike most other groundfish stock assessments, no age- or length-composition data were used directly in the assessment. Both the northern and southern populations were estimated to be above the target level of 40 percent of virgin spawning biomass (44 percent in Washington/Oregon and 62 percent in California).

Starry flounder were managed in the Other Flatfish complex until 2007, when the stock was removed from the complex and managed with stock-specific harvest specifications determined from the assessment. A new starry flounder assessment was not conducted in 2015, and the 2005 assessment was out of date for informing harvest specifications in 2017 and beyond. Therefore, the Scientific and Statistical Committee (SSC) recommended that 2017 and 2018 OFLs be a "rollover" of the 2016 OFL with an associated change from a category 2 to a category 3 assessment. For this stock, catch-only projections were not readily available, given workload constraints and time delays associated with obtaining total mortality estimates at the appropriate spatial scale (consistent with the 2005 assessments). Further, the starry flounder stock has consistently been harvested at approximately 2 percent of the allowable harvest, and there are no conservation concerns for this underutilized stock.

The Council considered managing starry flounder within the Other Flatfish complex starting in 2017. This consideration was based on the stock becoming a data-poor category 3 stock and the convention of managing data-poor stocks in complexes (Pacific cod is the only category stock currently managed using stock-specific harvest specifications). While this management change was not likely to have any differential biological impact, since starry flounder are not targeted and are an under-utilized stock, this measure would have required changes to the Amendment 21 allocations for either the Other Flatfish complex, or starry flounder, and it was considered too complicated for inclusion in this action.

2.3.2 Transferring Shorebased Quota Pounds to the Mothership Sector

This proposal would provide the following actions as an interim approach subject to the 5-year review of the trawl catch share program:

- Allow the transfer of quota pounds (QP) for selected species from the shorebased IFQ sector to mothership (MS) co-ops.
- Establish overall transfer caps on the total amount of QP that could be transferred for each eligible species.
- Establish caps on the amount of QP that could be transferred by the holder of each MS catcher vessel permit.

At the beginning of the trawl catch share program, shorebased quota shares (QS) were issued to every limited entry (LE) trawl permit based on a variety of criteria, including catch history, meeting bycatch needs, and equal allocation. Because of the equal allocation criteria, even permits with no shorebased sector history (those that fished only in the MS sector during the allocation period) received some QS for each species. All permits with no shorebased sector history received the same total amount of QS of each species because equal allocation was the only basis on which they received an allocation.[3]

[3] Permits with no shorebased history received an allocation of shorebased QS only because of the equal allocation element of the allocation formula. A portion of all non-overfished species ("target species") QS was allocated equally among all permits, including those with no shorebased history. For overfished species (including all of the species covered in this proposal), the tie

For the MS sector, MS catcher vessel endorsements and whiting catch history allocations[4] were made to permits that delivered a minimum threshold amount of whiting to the MS during an allocation period. Thirty-seven permits received such allocations.

Allocations of at-sea whiting fishery bycatch species (canary rockfish, darkblotched rockfish, POP, and widow rockfish) are distributed within the MS sector in proportion to the whiting catch history allocations. Under this proposal, the MS allocations for these species ("transfer species") could be augmented by the transfer of shorebased QP to the MS sector.

Overall Transfer Cap: For each species, the overall cap on the total QP eligible for transfer would be the amount of QS allocated to a given MS catcher-vessel-endorsed LE permit that had no shorebased sector history times 34, the total number of such permits that currently exist (catch history endorsements from three permits were stacked on other MS catcher-vessel permits such that the total number of permits was reduced from 37 to 34). The projected transfer caps are shown in Table 2-3.

Table 2-3. Proposed transfer species caps, expressed as a percent of the shorebased allocations.

	Canary	**Darkblotched**	**Pacific Ocean Perch**	**Widow Rockfish**
Cap	15%	20%	20%	11%

Individual Transfer Cap: The maximum amount of QP for a particular species that could be transferred by any single MS catcher-vessel permit holder would be that permit's share of the total whiting catch history times the overall transfer cap. For any particular unit of QS or QP, there would be no way to identify the criteria on which its issuance was based. Therefore, QP sourced from any QS might be transferred to the MS co-op sector account, so long as the QPs were first acquired by a vessel owner

to the equal allocation element is through the equally allocated target species. To determine the likely overfished species bycatch need for each permit and the permit's overfished species QS allocation, fleet average bycatch rates by area and depth fished were calculated and applied to the distribution of tows by area and depth, as recorded in individual vessel logbooks. However, trawl logbooks are only available for shorebased deliveries. Therefore, for vessels without shorebased deliveries, the fleet average distribution of tows was used in place of the individual logbooks. Thus, for permits without shorebased deliveries, overfished species QS was allocated through a formula that used the equally allocated target species QS and a single fleet average distribution of tows, such that each such permit received the same initial allocation of overfished species QS. Without the equal allocation element, those permits would have received no target species QS and, therefore, no overfished species. For permits that also had some shorebased history, the overfished species QS allocated based on the equal allocation of target species QS varied because their fishing areas as recorded in logbooks varied from one another.

Canary rockfish is an exception to the general case for overfished species because there was also a direct equal allocation of canary rockfish QS. The amounts of target species and canary QS that were allocated equally were the shares of the fleet's catch history, as represented by permits that were bought back in 2003.

[4] Mothership whiting catch history allocations are similar to shorebased QS allocations in that the catch history allocations are converted to a percent that is applied to the annual sector allocation to determine the annual amount of whiting pounds deliverable by the permit to the co-op to which the permit belongs.

whose vessel was currently registered to an MS/coefficient of variation (CV) -endorsed limited entry permit and who held an IFQ vessel account.

Additional Considerations: Currently, the industry has organized itself into a single co-op, but it is not required to do so. Additionally, it is possible that some vessels could choose to participate in the non-co-op fishery. In order to address these contingencies, a co-op transfer cap could be specified.

Co-op Transfer Cap: The maximum amount of QP for a particular species that could be transferred to any single MS co-op would be that co-op's share of the total whiting catch history times the overall transfer cap. If this proposal were to be implemented by establishing a co-op-QP account on which the co-op would draw if it had an overage, then the co-op could transfer QP back to the shorebased sector later in the year if it determined it would not need the QP.

This measure was rejected because the Council received advice from NMFS that the measure was likely too complicated for inclusion with 2017-2018 biennial action. It would have presented implementation issues.

2.3.3 Overfished Species Hotspot Closures in California

Nine new area closures in California were analyzed to mitigate increased overfished species impacts, which might occur because of the proposed 2017-2018 California recreational season structures. The proposed season structures would allow access to deeper depths than has been allowed in nearly a decade. As such, there would be uncertainty regarding angler behavior and the model projections for overfished species. If catch were tracking higher than anticipated, the overfished species hotspot closures could be implemented to reduce catch.

The Council excluded the overfished species hotspot closures from Alternative 2 based on changes in outreach, inseason tracking and management, current fishery performance, and other matters raised by CDFW (Agenda Item G.4.a, Supplemental CDFW Report 1, June 2016). The Council decision to exclude this measure was also related to the management measure that would grant NMFS authority to change routine management measures in the recreational and commercial fisheries based upon attainment or projected attainment of a Federal harvest limit for black rockfish, canary rockfish, and yelloweye rockfish. That is, the ability to control catch inseason would increase with the ability to take action outside of a Council meeting. As such, the hotspot closures may no longer be needed. This measure was not included based on advice from CDFW.

3.0 AFFECTED ENVIRONMENT

This section describes the affected environment components that have changed since the 2015 EIS and indicates where there are anticipated impacts from the proposed action. The affected environment reflects current conditions before the proposed actions would be implemented. This EA incorporates the affected environment from the 2015 EIS by reference. This chapter is organized into the sections below:

- Section 3.1 Physical Environment, including Essential Fish Habitat
- Section 3.2 Biological Resources
- Section 3.2 The Socioeconomic Environment

Table 3-1 shows the components of the human environment and indicates whether Alternative 1, the No Action Alternative, or Alternative 2, the Preferred Alternative, is anticipated to have an impact on the resource component and therefore, requires further analysis in this EA.

Table 3-1. Resources potentially affected by Alternative 1 and Alternative 2.

Alternatives	Habitat and EFH (section 3.1)	Ecosystem (see 2015 EIS)	Marine Mammals (see 2015 EIS)	Seabirds (section 3.2.6)	Groundfish (section 3.2.1)	Economic (section 3.3)	Ecosystem Component Species (see 2015 EIS)	Listed Eulachon (section 3.2.5)	Listed Salmon (section 3.2.7)
Alternative 1 and Alternative 2	Y	N	N	N	Y	Y	N	N	N

N=No impact is anticipated by the alternatives on the resource component.
Y=An impact is anticipated.

3.1 Physical environment, including Essential Fish Habitat

This EA includes information that has changed since the 2015 EIS. The physical environment has not significantly changed since the 2015 EIS. Refer to the 2015 EIS for information on the physical environment.

3.2 Biological Resources

Refer to the 2015 EIS for information on the species managed under the Groundfish FMP. The sections below describe biological resources that have changed since the 2015 EIS and that are potentially affected by the proposed action.

3.2.1 Groundfish

As indicated in the 2015 EIS, more than 90 species of groundfish are managed under the Groundfish FMP. The sections below address species affected since the 2015 EIS was drafted.

3.2.1.1 Widow Rockfish

The detailed information on life history, historical catch, and management information for widow rockfish can be found in the 2016 SAFE document (Council 2016); the information has not substantially changed since the 2015 EIS. Widow rockfish was declared rebuilt in 2012; however, the harvest specifications in 2015-2016 were maintained at a constant catch that was below the default HCR due to uncertainty in the stock assessment.

A new full assessment of widow rockfish was conducted in 2015 (Hicks and Wetzel 2015). The assessment indicated that the stock was at 75.1 percent depletion at the start of 2015 (Figure 3-1). The data used for the 2015 stock assessment were revised numerous times, including the following:

1. A new method of index standardization for the Northwest Fisheries Science Committee (NWFSC) trawl survey using a geostatistical delta-GLMM model
2. A new steepness value (0.798) based on an updated meta-analysis of steepness [The prior distribution on steepness in the meta-analysis was recalculated without the widow rockfish values.]
3. A prior distribution developed for the natural mortality parameter from an analysis of a maximum age of 54 years
4. Updated methods of expanding fishery length and age composition, as well as survey conditional age at length
5. New ageing error tables

For this assessment, there was a more thorough investigation of available age and length data, increasing the amount of these data relative to previous assessments. In addition, Washington historical landings were reconstructed. Other changes from the last assessment included how the fisheries were structured and how selectivity was modeled. The fleets were reconfigured based on fishing strategy, rather than on geographic area as was the practice in previous assessments. The triennial survey was considered a single time series rather than split as were most other West Coast assessments. The SSC categorized the stock as category 1.

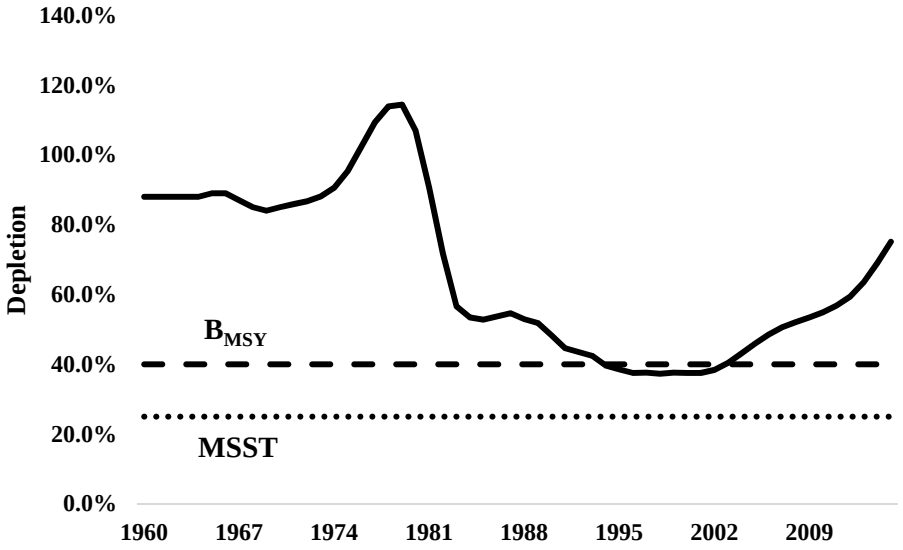


Figure 3-1. Relative depletion of widow rockfish from 1960 to 2015, based on the 2015 stock assessment.

3.2.2 Darkblotched Rockfish

The detailed information on life history, historical catch, and management information for darkblotched rockfish can be found in the 2016 SAFE document (Council 2016). This section discusses stock productivity relative to rebuilding success because the stock is projected to rebuild in 2016.

3.2.2.1.1 Stock Productivity Relative to Rebuilding Success

Gertseva et al. (2015) fixed steepness at its prior mean of 0.779. This prior mean was estimated using a likelihood profile approximation to a maximum marginal likelihood, mixed-effect model for steepness from ten category 1 rockfish species off the U.S. West Coast (POP, bocaccio, canary, chilipepper, black, darkblotched, gopher, splitnose, widow, and yellowtail rockfish) (Figure 3-2). This likelihood profile model is intended to synthesize observation-level data from assessed species, while avoiding the use of model output, thus improving upon previous meta-analyses (Dorn 2002; Forrest et al. 2010). This methodology has been simulation-tested, and the SCC has recommended it for use in stock assessments.

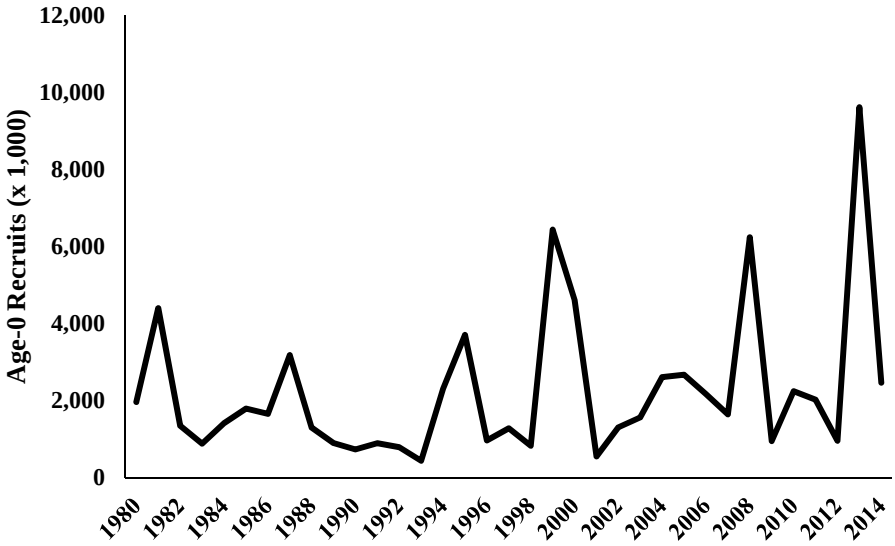


Figure 3-2. Estimated recruitments of darkblotched rockfish, 1980 to 2014.

3.2.2.2 Pacific Ocean Perch

The detailed information on life history, historical catch, and management information for POP can be found in the 2016 SAFE document (Council 2016). This section discusses stock productivity relative to rebuilding success.

3.2.2.2.1 Stock Productivity Relative to Rebuilding Success

Stock-recruitment steepness was estimated external to the 2011 POP stock assessment base model at 0.4 (and then fixed in the model), which is low compared to steepness estimates from POP assessments conducted off Canada and Alaska. The 2011 assessment assumed no connectivity with the other assessed POP stocks in Canada and Alaska. POP off the U.S. West Coast (mostly Washington and Oregon) are at the southern end of the range where there are enough POP to be commercially important, and the numbers seen are likely related to movement across the Canadian border, as well as reproductive success (recruitment), stock status, and fishing mortality north of the border. Given there is no evidence of stock structure in the meta-population of POP in the northeast Pacific, and larval distribution of slope rockfish tends to be widespread geographically, it is plausible that steepness is higher than determined in the 2011 assessment, which would tend to estimate a less depleted and more productive stock. The major axis of uncertainty in the assessment is steepness, with states of nature ranging from a low steepness of 0.35 to a higher value of 0.55. If steepness were as high as 0.55, the POP stock would be on the verge of being rebuilt at the start of 2011 (depletion = 39.9 percent) and would be projected to be rebuilt at the start of 2012. Under the base case model, with a steepness of 0.4 and continuing to manage POP using the

86.4 percent SPR harvest rate in the current rebuilding plan, the stock would be projected to rebuild by 2051.

Recruitment trends estimated in the 2011 POP assessment indicate that, like most assessed rockfish, recruitment has been relatively low in the last few decades compared to the 1950s and 1960s. However, the 1999 and 2000 year classes were estimated to be above average, and the 2008 year class recruitment, while uncertain, appeared to be the largest in at least the past 50 years (Figure 3-3).

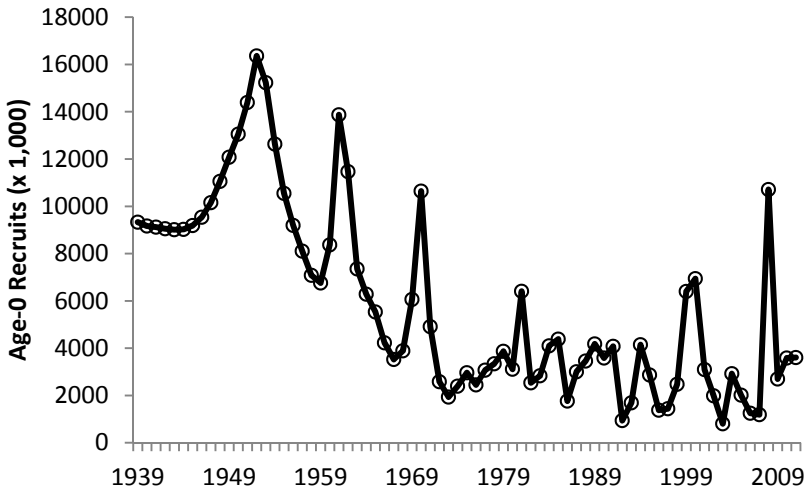


Figure 3-3. Time series of estimated (age-0) POP recruitments.

3.2.2.3 Big Skate reclassification to in the fishery

Detailed information on the distribution, life history, stock status, management history, and stock productivity, can be found in the Council's SAFE document (Council 2016). This section discusses fishing mortality of big skate because this was the change since the 2015 EIS that is driving the modification in stock designation.

3.2.2.3.1 Fishing Mortality

Historically, skates have not been high-priced fishery products in general. They are taken mostly as bycatch in other commercially important fisheries (Bonfil 1994). Although skates are caught in almost all demersal fisheries and areas off the U.S. Pacific coast, the vast majority (almost 97 percent) are caught with trawl gear.

Landing records indicate that skates have been retained on the U.S. Pacific Coast at least since 1916 (Martin and Zorzi 1993). Little is known about the species composition of West Coast skate fisheries,

particularly prior to 1990. With few exceptions, big skate landings have been reported, along with other skate species, under the market category "Unspecified Skates."

Historically, only the skinned pectoral fins or "wings" were sold, although a small portion of catch would be marketed in the round (whole). The wings were cut onboard the boat, and the remainder was discarded. Currently, West Coast skates are marketed both whole and as wings. Skates wings are sold fresh or fresh-frozen, as well as dried or salted and dehydrated, for sale predominantly in Asian markets (Bonfil 1994; Martin and Zorzi 1993).

The demand for whole skates increased greatly during the mid-1990s, as evidenced by the increase in the number of trips where skates were landed. While skates were previously encountered predominantly as bycatch, landings data from this period reveal greater targeting of skates by some vessels. A vulnerability score of 1.99 indicates a medium concern for overfishing the stock. After a few years, the whole-skate market cooled due to downturns in Asian financial markets (Peter Leipzig, Fishermen's Marketing Association, pers. com. as cited by Gertseva and Schirripa [2008]).

3.2.3 Protected species

NMFS has reinitiated consultation for short-tailed albatross, eulachon, and salmon. These actions are based on new data obtained for the three species.

In 2012, NMFS completed the Biological Opinion (BiOp) on Continuing Operation of the Pacific Coast Groundfish Fishery (NMFS 2012 BiOp). The NMFS 2012 BiOp covered commercial, recreational, and tribal fisheries in the U.S. EEZ off the coasts of Washington, Oregon, and California. The NMFS 2012 BiOp indicated that the ongoing implementation of the groundfish fishery would not likely jeopardize eulachon, green sturgeon, humpback whales, Steller sea lions, and leatherback sea turtles. The NMFS BiOp indicated that the PCGFMP fishery would not likely jeopardize non-salmonid marine species, including listed eulachon, the southern distinct population segment (The BiOp also indicated that the PCGFMP fishery would not likely have an adverse effect on green sea turtles, olive ridley sea turtles, loggerhead sea turtles, sei whales, North Pacific right whales, blue whales, fin whales, sperm whales, Southern Resident killer whales, Guadalupe fur seals, or the critical habitat for Steller sea lions. The eastern DPS of Steller sea lions was delisted on November 4, 2013 (78 FR 66140); however, this delisting did not change the designation of the codified critical habitat for the eastern DPS of Steller sea lions. Section 3.5.2.2 in the 2015 EIS describes the Incidental Take Statement (ITS) from this BiOp.

The U.S. Fish and Wildlife Service (USFWS) BiOp (2012) indicated that the groundfish fishery would not likely jeopardize the continued existence of short-tailed albatross. USFWS also concurred with the

NMFS determination, as stated in a biological assessment, that the fishery would not likely have an adverse effect on the marbled murrelet, California least tern, southern sea otter, bull trout, or bull trout critical habitat.

The NMFS 2012 BiOp established the Council's Endangered Species Act (ESA) Workgroup to evaluate the take of listed species (except for salmon) for each biennium and to make recommendations to the Council and NMFS on changes to groundfish management measures needed to address the take of listed species, as well as on reinitiation of ESA Section 7 consultation. In June 2015, the ESA Workgroup recommended that NMFS reinitiate ESA Section 7 consultation on eulachon and short-tailed albatross because the ITS amounts for these species were exceeded (D.4.a. Supplemental Groundfish ESA Workgroup Report, June 2015). Because none of the other species covered in the NMFS and USFWS BiOps had exceedances of the ITS amounts, and because the exceedances were likely not due to the management measure structure of the fishery, the ESA Workgroup did not make any recommendations for new management measures for the 2017-2018 biennium.

Since the 2015 Report, the Council's ESA Workgroup has evaluated catch data on all of the species covered in the NMFS 2012 BiOp and on short-tailed albatross, which is covered in the USFWS 2012 BiOp. The ESA workgroup recommended that Section 7 consultation be initiated for eulachon and short-tailed albatross. The remaining species in the NMFS 2012 BiOp did not have take amounts that exceeded the incidental take amounts established in the NMFS 2012 BiOp; therefore, the ESA Workgroup did not recommend reinitiation or any fishery changes for the 2017-2018 biennium. Those species are also not included in this EA, because there is no new information regarding the take of those species since the ESA Workgroup's 2015 report.

3.2.4 Eulachon

For detailed information on the distribution, life history, stock status, and management history, see the report from the Council's ESA Workgroup Report "Observed and Estimated Bycatch of Eulachon in 2002-2013 US West Coast Groundfish Fisheries" (Gustafson et al., June 2015). This section describes stock productivity and fishing mortality of eulachon because these components have changed since the 2015 EIS.

3.2.4.1 Stock Productivity

Adult spawning abundance of the southern DPS of eulachon has increased since its listing in 2010 (NMFS 2016). A number of data sources, including spawning stock biomass (SSB) estimates in the Columbia and Fraser Rivers, catch per unit effort in small mesh bottom trawl surveys off the west coast of

Vancouver Island, incidental catch in the West Coast bottom trawl survey, and estimated bycatch in ocean shrimp trawl fisheries, indicate that eulachon abundance in some subpopulations within the southern DPS were substantially higher from 2011 to 2015 compared to indications of very low abundance from 2005 to 2010 (Gustafson et al. 2016). The improvement in estimated abundance in the Columbia River, relative to the time of listing, reflects both changes in biological status and improved monitoring. Documentation of eulachon returning to the Naselle, Chehalis, Elwha, and Klamath Rivers from 2011 to 2015 also likely reflects both changes in biological status and improved monitoring (Gustafson et al.) The 2010 Biological Review Team (BRT) noted several issues of concern. The BRT reported the following:

> Abundance had declined to what appeared to be historically low levels in the Fraser River and nearly so in the Columbia River; the very limited available monitoring data suggested that eulachon in northern California had experienced an abrupt decline several decades previously; and attempts to estimate actual spawner abundance in some rivers in British Columbia that were known to have supported significant First Nations fisheries in the past had resulted in very low estimates of spawning stock (Gustafson et al. 2016).

Since the 2010 status review (Gustafson et al. 2010), monitoring of annual abundance of eulachon in several areas of the DPS has increased substantially. Annual monitoring of SSB has continued in the Fraser River (1995 to 2015) and expanded to the Columbia (2011 to 2015), Grays (2011 to 2013, 2015), Cowlitz (2015) Naselle (2015), and Chehalis (2015) Rivers. In addition, the Washington Department of Fish and Wildlife has retrospectively estimated historical SSB in the Columbia River for 2000 to 2010 using pre-2011 expansions of eulachon larval densities (Gustafson et al. 2016). These retrospective estimates indicate that the total eulachon run biomass in the Columbia River may have been as high as 3,150 metric tons (mt) in 2001 and as low as 35 mt in 2005 (Gustafson et al. 2016).

Mean SSB over the five-year period (2006 to 2010) immediately prior to the 2010 BRT's analysis was estimated at 20 mt in the Fraser River and 153 mt in the Columbia River. In contrast, mean SSB over the last five years (2011 to 2015) was estimated at 127 mt in the Fraser River and 4,007 mt in the Columbia River (Gustafson et al. 2016).

The situation in the Klamath River is more positive than it was during the 2010 status review, with adult eulachon presence being documented in the Klamath River in the spawning seasons of 2011 to 2014, although it has not been possible to calculate estimates of SSB in the Klamath River (Gustafson et al. 2016). However, since Moody's (2008) compilation of information on eulachon abundance, very little additional data on the status of eulachon in coastal rivers north of the Fraser River have become available. Newly obtained catch per unit of effort estimates for the Kemano and Kitimat Rivers suggest substantial

recent declines without apparent recovery (Committee on the Status of Endangered Wildlife in Canada [COSEWIC] 2011). Anecdotal observations, as reported in several First Nations' newsletters and in annual environmental reports, are compiled in for this area of the DPS (Gustafson et al. 2016). The Skeena (2010 to 2015), Kemano (2015), and Kingcome (2012) Rivers have apparently supported substantial runs of spawning eulachon in recent years; however, eulachon in the Kitimat River (2012, 2014) have reportedly remained at low levels (Gustafson et al. 2016). Although eulachon abundance in monitored populations has generally improved, especially in the 2013 to 2015 return years, recent poor ocean conditions and the likelihood that these conditions will persist into the near future suggest that population declines may be widespread in the upcoming return years. Therefore, it is too early to tell whether recent improvements in the southern DPS of eulachon will persist or whether a return to the severely depressed abundance years of the mid-late 1990s and late 2000s will reoccur.

3.2.4.2 Fishing Mortality

This section provides estimates of bycatch of the ESA-listed southern DPS of eulachon in observed U.S. West Coast federally permitted groundfish fisheries from 2002 to 2013. NMFS assumes 100 percent mortality of eulachon incidentally caught and subsequently discarded in these fisheries. A number of previous reports (NWFSC 2009, 2010; Bellman et al. 2008, 2009, 2010, 2011a; Al-Humaidhi et al. 2012) have provided data on estimated bycatch of eulachon in U.S. West Coast commercial fisheries, which were derived from the West Coast Groundfish Observer Program (WCGOP) and the At-Sea Hake Observer Program (A-SHOP) data.

Data presented include additional observed eulachon bycatch, both by weight and as number of individual fish caught, for the southern DPS of eulachon. Bycatch ratios are reported for eulachon as weight and as number of individual fish caught per mt of total fish caught per haul. These ratios are then used to estimate eulachon bycatch in the fleet in sectors where only portions of the total hauls are observed. Information presented includes eulachon bycatch estimates for all groundfish fisheries observed by the WCGOP and A-SHOP from 2002 to 2013.The following commercial groundfish fishery sectors had observed eulachon bycatch during 2002 to 2013:

- LE and IFQ bottom trawl fishery
- IFQ non-hake midwater trawl fishery
- IFQ shoreside Pacific hake trawl
- IFQ at-sea Pacific hake MS fishery
- IFQ at-sea Pacific hake catcher-processor fishery

- IFQ at-sea Pacific hake tribal MS

Table 3-2 presents a summary of the permits, gear used, target groups, vessel length range, fishing depth range, and management of fishery sectors and sub-sectors in U.S. West Coast groundfish fisheries that have had documented eulachon bycatch.

Table 3-2. Generalized descriptions of U.S. West Coast groundfish fisheries that have had observed bycatch of eulachon.

							Management	
Sector	**Sub-Sector**	**Permits**	**Gear(s)**	**Target(s)**	**Vessel length (m)**	**Depths (m)**	**2002-2010**	**2011-2013**
Limited Entry (LE) Trawl		Federal LE permit with trawl endorsement	Bottom trawl, Midwater trawl	Groundfish assemblage	11–29	Wide range	Cumulative two-month trip limits; depth-based closures; 1423% observer coverage	Individual Fishing Quotas (IFQ); 100% observer coverage
At-Sea Hake	Mothership-Catcher Vessel (MSCV)	LE permit with MSCV endorsement	Midwater trawl	Pacific hake	26–45	53–460	Seasonal quotas for target and bycatch species of concern; 100% observer coverage	IFQ; seasonal; 100% observer
	Catcher/ processors (C/P)	LE permit with C/P endorsement	Midwater trawl	Pacific hake	82–115	60–570	Same as At-Sea Hake MSCV	IFQ; seasonal; 100% observer
	Tribal	(none)	Midwater trawl	Pacific hake		53–460	Tribal; 100% observer coverage	Tribal; 100% observer coverage
Shoreside Hake		LE permit with trawl endorsement	Midwater trawl	Pacific hake	17–29	Wide range	Same as At-Sea Hake MSCV; electronic monitoring	IFQ; Seasonal; 100% observer coverage of landed catch

Commercial groundfish fisheries the WCGOP observed that did not have any bycatch of eulachon from 2002 to 2013 include the following:

- LE bottom trawl – targeting California halibut
- OA bottom trawl – targeting California halibut
- LE fixed gear primary sablefish
- LE fixed gear non-primary sablefish
- OA fixed gear
- Nearshore fixed gear state-permitted (Oregon and California)

The WCGOP also observes some fisheries that incidentally catch groundfish, including the state-permitted ocean shrimp trawl fisheries. The majority of eulachon bycatch off the U.S. West Coast occurs in state-operated commercial ocean shrimp trawl fisheries in California, Oregon, and Washington. These non-groundfish trawl fisheries are permitted by the individual states, however, and they are not regulated under the Pacific Coast Groundfish FMP. Therefore, they do not fall under the Observed and Estimated Bycatch of Eulachon in 2002-2013 US West Coast Groundfish Fisheries Biological Opinion (Agenda Item D4, supplemental attachment 3, June 2015).

Eulachon bycatch in the shrimp trawl fisheries relates to species conservation. Trends in eulachon catch from the ocean shrimp fishery and comparisons of catch trends to the fishery-independent NWFSC West Coast Bottom Trawl Survey are reported in Ward et al. (2015). To define the scope of the reporting required under the 2012 BiOp clearly, eulachon bycatch in ocean shrimp fisheries is reported in Appendix A of that document.

3.2.5 Short-tailed albatross

The sections below describe the most recent status review, which constitutes new information, on short-tailed albatross. This information, as well as detailed information on status and life history, is found in the following document: Short-tailed Albatross (*Phoebastria albatrus*) 5-Year Review: Summary and Evaluation," USFWS, Anchorage Fish and Wildlife Field Office, Anchorage, Alaska, 2014.

3.2.5.1 Current Population Status

Following the methods from the most recent 5-year review (USFWS 2009), population estimates were derived from Torishima colony direct counts of adults, eggs, chicks, and productivity estimates made by Dr. Hiroshi Hasegawa and staff of the Yamashina Institute for Ornithology. Dr. Hasegawa also made four counts of birds in the Senkaku Islands (1990, 1991, 2001, and 2002), but none has been made since 2002. In making total population estimates, Senkaku population data are extrapolated under the assumption that factors affecting population growth have remained similar to those observed on Torishima. As noted above, the Senkaku breeding population estimate is an unverified projection beyond 2002 (due to restricted access to the island), unlike Torishima, which is visited annually to verify population growth. Population estimates are calculated using a deterministic population model (P. Sievert, unpublished data, 2014).

The following data provide estimates of adult (breeding age) birds:

- Torishima: The 2013-2014 population counts of short-tailed albatross indicate 609 breeding pairs (or 1,218 breeding adults) (H. Hasegawa unpublished report, February

2014; Appendix 1). Assuming that 25 percent of breeding-age adults do not return to breed each year (H. Hasegawa pers. comm. December 2002), this would represent an adult population of 1,624 at Torishima at the start of the 2013-2014 nesting season.

- Senkaku Islands: In the spring of 2002, H. Hasegawa counted 33 fledglings, 32 at Minami-kojima and 1 at Kita-kojima. Assuming a breeding success rate of 67 percent (mean rate for Torishima colony over the last 15 years), this would represent 49 nesting pairs, or 98 adults in 2002-2003 (P. Sievert, pers. comm. 2014). During the same visit in 2002, H. Hasegawa counted 77 immature/adult birds on Minami-kojima and 4 immature birds on Kitakojima, totaling 81 immature/adult individuals on site. If this population is growing at 7.5 percent per year (growth rate of Torishima colony), the total adult population might be 220 in 2013-2014, representing 110 breeding pairs. Assuming that here too, some 25 percent of the adults do not return to breed each year, the population of breeding-age adults that potentially nest on the Senkaku Islands is estimated to be approximately 293 at the start of the 2013-2014 nesting season.
- Other breeding sites: As of 2013-2014, there are four other documented active breeding sites for short-tailed albatross. Two pairs have been documented in the Ogasawara (Bonin) Island group, at Muko-jima and Nakodo-jima. In the northwestern Hawaiian Islands, one pair is breeding at Midway Atoll (having fledged a chick in 2011, 2012, and 2014), and another suspected female-female pair has been attempting to breed at Kure Atoll since 2010. Other breeding age adults that are not pair-bonded have been reported at these sites; therefore, assuming the same 25 percent of breeding-age adults do not return to breed each year, this would represent an adult population of 11 at these breeding sites.

Based on the above data, the total population estimate for breeding age short-tailed albatrosses as of the 2013-2014 nesting season is 1,928 individuals.

3.2.5.2 Current Marine Distribution

Extensive satellite tracking of short-tailed albatrosses has occurred, especially breeding adults from 2006 to 2008 and juveniles from 2008 to 2012, to provide information on the marine distribution of this species. Tracking efforts have expanded upon the information summarized in the most recent five-year review (USFWS 2009) based on at-sea sightings (Piatt et al. 2006, Zador et al. 2008). Tracking of all age classes has helped to provide a more complete understanding of the range for this species and differences between adult and juvenile birds.

Both adult and juvenile birds extensively use areas of the western Pacific, east of Japan. During most of the incubation period and all of the chick-rearing time, adult albatrosses foraged extensively in these waters (Suryan et al. 2008, Yamashina Institute for Ornithology and Oregon State University unpubl. data). The distribution of adult and juvenile short-tailed birds was also similar in their extensive use of the waters among the Kurile Islands, the Aleutian Islands, and the outer Bering Sea Continental shelf (Suryan et al. 2006, Suryan and Fischer 2010, Deguchi et al. 2014; Kuletz et al. 2014). Albatrosses used the outer Bering Sea shelf most during summer and fall, with a clear pattern of moving north to the northern submarine canyons (Navarin, Pervenets, Zemchug) in late summer and fall (Zador et al. 2008, O'Connor 2013). During winter, the birds moved south, but they continued to occupy the southeastern Bering Sea, Aleutian Islands, and Gulf of Alaska (O'Connor 2013).

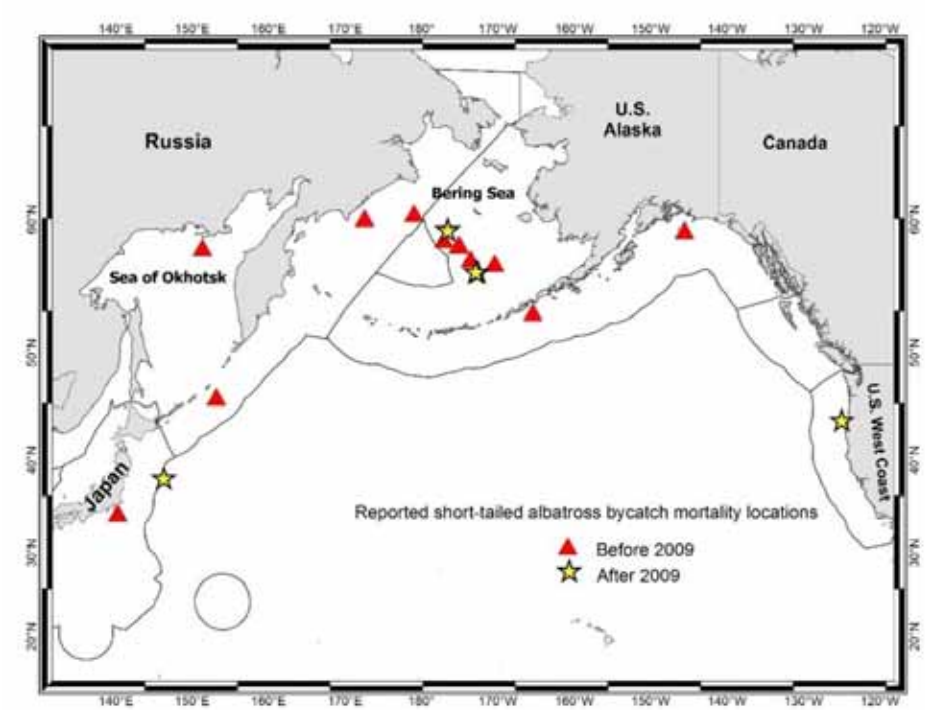
Juvenile (greater than or equal to one-year-old) short-tailed albatrosses travel more broadly throughout the North Pacific than adult birds. Seasons of overlap in tracking non-breeding adult and juvenile/sub-adult albatrosses (those individuals not having to return to the breeding colony to tend eggs or chicks) included summer and early fall (May to September). During summer and early fall, juvenile albatrosses traveled extensively in the Sea of Okhotsk, Russia, and the western Bering Sea where few adults ventured. Juvenile albatrosses traveled to the West Coast of North America and more extensively throughout the North Pacific transition zone between Hawaii and Alaska. Additionally, juvenile albatrosses were tracked to Arctic regions of the Bering Strait (Deguchi et al. 2014), and at least one individual was sighted from two different survey vessels in the Chukchi Sea in 2012 (Day et al. 2013; Gall et al. 2013). Multi-year tracking studies of juvenile to sub-adult birds indicate that distribution patterns and habitat use of subadult birds become similar to adults by age three (Suryan et al. 2013).

Kuletz et al. (2014) examined four decades of data from the North Pacific Pelagic Seabird Database. Data showed that short-tailed albatrosses, along with Laysan and black-footed albatrosses, increased in abundance in the Aleutians and Bering Sea between 1970s and 2000. Furthermore, the centers of distribution in the Bering Sea have shifted northward, most dramatically for short-tailed albatrosses, at approximately 17 kilometers (10.5 miles)/year. For short-tailed albatross, as the numbers of observations have increased, so has their occupation of northern areas of the outer domain and shelf slope regions.

3.2.5.3 Fishing Mortality and Bycatch Mitigation

Bycatch of short-tailed albatrosses in commercial fisheries continues to be a major conservation concern, especially for younger age classes (82 percent of the 17 reported fishing mortalities were less than 4 years old; Yamashina Institute for Ornithology and NMFS unpubl. data). Since the most recent five-year review

(USFWS 2009), five short-tailed albatross mortalities have been observed during commercial fishing activities, three in Alaska, one off Oregon, and one off Japan (Figure 3-4).



Note: The 17 bycatch locations are divided into before (n = 12) and after (n = 5) 2009, when the last 5-year review was prepared. Two of the five post-2009 bycatch locations in the Bering Sea were very close to each other and, therefore, the two locations appear to overlap almost completely (Yamashina Institute for Ornithology and National Marine Fisheries Service unpubl. data).

Figure 3-4. Reported short-tailed albatross mortalities associated with commercial fishery bycatch, 1983 to 2014.

For the U.S., these were the first observed mortalities of short-tailed albatrosses in more than 12 years (since 1998). During that 12-year period (1998 to 2010), however, there were three reported mortalities in Russian fisheries (2002, 2003, and 2006). Following the mortality of a short-tailed albatross off the U.S. West Coast in 2011, the Council, which provides oversight of fisheries management in the Pacific, adopted recommendations for seabird bycatch mitigation in November 2013. The mitigation requires that streamer lines be deployed during setting operations on commercial fixed gear vessels 55 feet (17 meters) or greater in length with a safety exception in the event of rough weather (Council 2013). Streamer lines are now required for all longline vessels greater than 55 feet in overall length. Research is underway to develop seabird bycatch options in the West Coast sablefish fishery for vessels less than 55 feet (17 meters) long and to confirm the effectiveness of pending new regulations for vessels 55 feet (17 meters) and longer (E. Melvin and R. Suryan, pers. comm.). Additionally, efforts are continuing to increase seabird bycatch awareness and the use of seabird deterrents throughout the range of this species.

3.2.6 Salmon

The information below describes the fishing mortality of salmon. For detailed information on salmonid life history and stock status, see the most recent 5-year status review at the following website: http://www.westcoast.fisheries.noaa.gov/publications/status_reviews/salmon_steelhead/2016/2016_jones-et-al.pdf**Error! Reference source not found.**

Table 3-3 shows the estimated annual catch of salmonids in all sectors of the trawl catch share program from 2002 to 2014. Annual temporal and spatial variations in the catch of salmon are associated with the behavior and biology of Chinook salmon and Pacific whiting. Salmon bycatch rates tend to be higher closer to shore and earlier in the season. The Shorebased IFQ Program tends to fish closer to shore where salmon are more abundant. However, no such factors adequately account for inter-annual variation in bycatch. Previous work found no "obvious or consistent correlation" between annual Chinook abundance and bycatch. Ocean conditions may play a role, but specific causative factors, at least any that can be used predicatively, have not been identified (NMFS 2006).

Table 3-3. Summary of the catch (including retained and discarded of protected species in the groundfish fishery's trawl catch share program from 2002 to 2014 (WCGOP data queried January 2016).

Protected Species (number of fish)												
	At-sea Whiting (MS,C/P)				Shorebased Whiting (IFQ)				IFQ Fixed Gear			
	2002-2010		2011-2014		2002-2010		2011-2014		2002-2010		2011-2014	
*	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.	Avg.	Max.
Chinook salmon ^	1,487	3,963	4,661	6,685	2,039	4,206	3,732	7,554	4,001	16,460	267	323
coho salmon ^	58	227	34	108	31	141	90	175	24	65	32	49
chum salmon ^	53	170	32	53	28	113	14	42	6	36	0	0
pink salmon ^	11	48	18	37	14	49	1,529	6,113	<1	2	<1	2
sockeye salmon ^	<1	2	0	0	0	0	<1	2	0	0	<1	1
Green sturgeon +	<1	2	0	0	--	--	--	--	10	31	23	38

Incidental take of endangered or threatened salmon is a concern for the Pacific whiting fishery. Endangered Chinook salmon are the most likely species to be affected by incidental take because of the spatial/temporal overlap between the Pacific whiting fishery and Chinook distribution. The season start dates are meant, in part, to prohibit fishing when incidental take of listed Chinook salmon is most likely

to occur. NMFS also has the option of closing inshore areas to fishing if too many salmon are caught or are projected to be caught.

Because of high variability in recruitment and other sources of uncertainty in stock assessment, catch limits vary substantially. In addition to coordinating harvesting efforts among the catcher/processor (C/P) vessels, the Pacific Whiting Conservation Cooperative engages in voluntary bycatch avoidance initiatives as part of an effort to reduce the incidental catch of species of concern, such as ESA-listed Pacific salmon and overfished rockfish. The C/P fleet also caught approximately four prohibited and protected species per every 100 metric tons of Pacific whiting in 2012, mostly Chinook salmon, but also chum salmon, coho salmon, pink salmon, eulachon, and Pacific halibut. Since 2005, NMFS has established mandatory bycatch limits in the at-sea Pacific whiting fishery for species of rockfish designated as overfished.

3.3 Socioeconomic Resources

This EA only includes information that has changed since the 2015 EIS. The socioeconomic environment has not significantly changed since the 2015 EIS. Refer to the 2015 EIS for information regarding socioeconomics. The SAFE Document is located on the Council's website at the following address: http://www.pcouncil.org/groundfish/safe-documents/. This document has also been updated with socioeconomic information. To provide context for the impacts in Chapter 4, the following sector summaries are provided. This information can also be found in sections 3.2.2 (Commercial), 3.2.4 (Tribal), and 3.2.5 (Recreational) of the 2015 EIS.

3.3.1 Commercial Fisheries

Although more than 90 species are managed under the Groundfish FMP, the ten highest-ranked species (or species groups) accounted for 92 percent of nominal shoreside ex-vessel revenue during 2002 to 2012. Just five species—sablefish, Pacific whiting, Dover sole, petrale sole, and shortspine thornyhead—accounted for 84 percent of all revenue (2015 EIS).

Commercial fisheries are broken into three categories. They are summarized below.

- Shoreside: The most notable shoreside groundfish fishery long-term trend is the increasing importance of sablefish and Pacific whiting relative to total shoreside groundfish revenue. Four species show increases in revenue when comparing the recent past to the long term: sablefish, Pacific whiting, Minor Nearshore Rockfish, and black rockfish (2105 EIS).
- Non-nearshore: The non-nearshore sectors primarily targets sablefish. Sablefish accounts for the most revenue, both because of its share of landings and its high value, followed by thornyheads.

A variety of other species, mainly rockfish, accounts for the remainder of groundfish landings and revenue (2015 EIS).

- Nearshore: The nearshore sector targets various other groundfish species. Although a relatively few species (cabezon, brown rockfish, gopher rockfish, blue rockfish, lingcod, and kelp greenling) account for almost three-quarters of the revenue, a diverse array of other rockfish species is also caught and makes up the balance of the landings (2015 EIS).

3.3.2 Tribal Fisheries

Tribal fisheries are summarized as follows. West Coast treaty tribes in Washington State have formal allocations for sablefish, black rockfish, and Pacific whiting. For other species without formal allocations, the tribes propose trip limits to the Council. The Council tries to accommodate these trip limits while ensuring that catch limits are not exceeded. While all four coastal tribes have longline fleets, only the Makah Tribe currently has a trawl fleet. The Makah Tribe participates in whiting fisheries with both a MS and shorebased component. On average, the treaty fisheries have accounted for 12 percent of total whiting landings and at-sea deliveries since 2005, generating an average of about $4 million (inflation-adjusted) per year (2015 EIS).

3.3.3 Recreational Fisheries

Recreational fisheries are broadly subdivided between private anglers and commercial passenger fishing vessels, commonly referred to as charter vessels. Private anglers fish from shore or from their own boats, while charter vessels take paying passengers (2015 EIS).

Saltwater recreational anglers on the West Coast target a diversity of marine resources (go to http://www.westcoast.fisheries.noaa.gov/fisheries/recreational/recreational_fishing_wcr.html for more information). These resources include highly migratory species (albacore and other tunas, striped marlin, common thresher and shortfin mako sharks), salmon and steelhead (Chinook, coho, and steelhead), groundfish (rockfish, lingcod, scorpionfish, greenling, flatfish, and sharks), and coastal pelagic species (pacific sardine, northern anchovy, market squid, pacific mackerel). They also include numerous state-managed species like barracuda, bass, bonito, sturgeon, and surfperches. Recreational fisherman also fish for invertebrates such as abalone, lobster, crab, clams, and oysters

Recreational fisheries are economically, socially, and culturally important. In 2012, roughly 1.6 million anglers took part in an estimated 7.4 million fishing trips on the West Coast (go to http://www.westcoast.fisheries.noaa.gov/fisheries/recreational/recreational_fishing_wcr.html for more

information). These anglers made over $1.8 billion in fishing trip and equipment expenditures, which supported over 18,800 jobs and approximately $2.5 billion in sales in 2012.

4.0 ENVIRONMENTAL CONSEQUENCES

This section evaluates impacts on resources that have changed since the 2015 EIS. This is accomplished by assessing impacts from the preferred new harvest specifications for big skate, widow rockfish, darkblotched, and POP, as well as from the new management measures. This EA incorporates the analysis of the environmental impacts described in the 2015 EIS by reference.

4.1 Impacts of Harvest Specifications Alternatives

This section describes the impacts of the harvest specifications alternatives for big skate, widow rockfish, darkblotched rockfish, POP, and Pacific whiting on physical resources, including EFH, biological resources, ESA-listed and protected species, and socioeconomic resources. Table 4-1 provides a comparison of Alternative 1 and Alternative 2 ACLs.

Table 4-1. Comparison of Alternative 1 and Alternative 2 ACLs. OFL and ABC values are identical between Alternative 1 and Alternative 2. Stocks with assessments are in bold.

Stock	**2017**			**2018**			**ACL Basis**
		Alt 1	**Alt 2**		**Alt 1**	**Alt 2**	
Big skate		**NA**	**494**		**NA**	**494**	--
Widow rockfish		**2,000**	**13,508**		**2,000**	**12,655**	--
Darkblotched rockfish		**406**	**641**		**419**	**653**	--
POP		171	281		176	281	--
Pacific whiting		--	**367,553**		--	**367,553**	**The U.S. 2015 total allowable catch (TAC) is used as the ACL proxy; the 2016 OFL is used as the 2017-2018 OFL proxy.**

4.1.1 Alternative 1 (No Action Alternative)

The sections below detail the effects of Alternative 1, which differ based on species. The sections are divided accordingly.

4.1.1.1 Physical Resources, including Essential Fish Habitat

The impacts on the physical environment have not significantly changed since the 2015 EIS. See Chapter 4.4 of the 2015 EIS for the effects of the fishery on EFH.

4.1.1.2 Biological Resources

This section evaluates the biological impacts on big skate, widow rockfish, darkblotched rockfish, and POP, as well as co-occurring groundfish stocks from the Alternative 1 harvest specifications for big skate, widow rockfish, darkblotched rockfish, and POP (Table 4-1). This section also evaluates the impacts of a range of TACs on Pacific whiting. It also evaluates the impacts of Alternative 1Big Skate

During development of the 2015-2016 harvest specifications and management measures, the Council, based on the best information available when it made its final recommendation, proposed removing skates (except for longnose skate) from the Other Fish complex and designating most of the skates, including big skate, as an EC species. NMFS approved and implemented that recommendation in 2015. Best estimates of mortality at that time indicated that harvest was 18 percent of the 2014 458-mt big skate contribution to the 6,832-mt Other Fish OFL. However, subsequent analysis by the Council's GMT indicated that the estimated mortality of big skate in 2014 was 422 mt, which was 92 percent of the 2014 458-mt OFL. Big skate was designated as an EC species because the best available scientific information indicated that it was not in need of conservation and management and that it generally met many of the criteria for the EC species designation outlined in the MSA National Standard 1 Guidelines.

In conjunction with an EC species designation, impacts on the species are monitored to determine whether the designation should be reconsidered based on new information. At its April 2015 meeting, the Council considered new information indicating that landings of "unspecified skate" were predominantly big skate (more than 90 percent). Therefore, the Council recommended that big skate trip limits be implemented in the Shorebased IFQ fishery to reduce its mortality to a level at or below its 2014 OFL contribution. The trip limits went into effect on June 1, 2015. They would, therefore, continue to be applied under Alternative 1.

Under Alternative 1, big skate would remain an EC species. It would not have species-specific harvest specifications, but it would continue to have a sorting requirement and trip limits for the Shorebased IFQ fishery. Under Alternative 1, the current trip limits for big skate would continue, and they are illustrated in

Table 4-2. Big skate trip limits for the Shorebased IFQ Program under Alternative 1 and 2.

Table 4-2. Big skate trip limits for the Shorebased IFQ Program under Alternative 1 and 2.

Jan-Feb	Mar-Apr	May-Jun	Jul-Aug	Sep-Oct	Nov-Dec
5,000 lb/ 2 months	25,000 lb/ 2 months	30,000 lb/ 2 months	35,000 lb/ 2 months	10,000 lb/ 2 months	5,000 lb/ 2 months

The trip limits above were designed to keep catch within the 458-mt 2014 big skate OFL contribution to the Other Fish complex. Because the 458-mt OFL contribution under Alternative 1 is similar to the 436.6-mt big skate fishery HG under Alternative 2, the trip limits under Alternative 2 are the same as the

trip limits under Alternative 1. Because the trip limits would be same under both Alternative 1 and Alternative 2, there would be no significant impacts on big skate from Alternative 1 as there would be neither anticipated changes in fishing behavior, nor targeting of big skate that would increase the mortality of the stock. Further, because the trip limits would be the same under both alternatives and would not likely result in changes in fishing behavior, there would be no anticipated impacts to other biological resources.

4.1.1.2.1 Widow Rockfish

Under Alternative 1, the widow rockfish ACL would be a constant catch of 2,000 mt. The Alternative 1 ACL was previously adopted due to uncertainty in the 2011 assessment. Therefore, continuing this ACL would implement harvest specifications that would not be based on the best available science because a new widow stock assessment was completed for the 2017-2018 biennial cycle. Under this alternative, trip limits and allocations for widow rockfish, which were designed to achieve the 2,000-mt ACL, would restrict commercial and recreational fisheries without providing a benefit to the stock, outside of simply reducing catch and increasing the population. This would be the case because the stock is rebuilt and is projected remain healthy (i.e., at or above the B_{40} percent biomass target) for the next 10 years, even under the more pessimistic and less likely low state of nature model provided in the 2015 assessment. There would be no anticipated impacts on other biological resources from the Alternative 1 widow harvest specifications as this alternative would continue to keep the fishery within the 2,000-mt widow rockfish ACL. The harvest specifications would not be expected to result in changes in fishing behavior that would affect other biological resources. Therefore, there would be no significant impact under Alternative 1.

4.1.1.2.2 Darkblotched rockfish

The 2015 darkblotched rockfish assessment (Gertseva et al. 2015) estimated a spawning stock depletion of 39.3 percent at the start of 2015, or just under the target biomass depletion ratio of 40 percent of unfished biomass. The 2015 assessment also projected the stock to be rebuilt by the start of 2016 before the new harvest specifications are implemented in 2017. However, darkblotched rockfish was not declared rebuilt because rebuilt status can only be determined when the stock status is at or above the overfished threshold in the year in which it was assessed (e.g., 2015). Therefore, while the 2015 assessment projected the stock to be rebuilt by the start of 2016, the stock cannot be declared rebuilt until a subsequent stock assessment is completed, and it indicates that the stock is above the overfished threshold in the year of the assessment (e.g., not a projection).

Amendment 24 established default HCRs that will remain in place, unless they require modifications. Modifications to default HCRs in biennial specification cycles can be based on, but are not limited to, changes in stock status from updated science. For rebuilding stocks, the default HCR is the HCR listed in the rebuilding plan unless the stock has been declared rebuilt since the last biennial harvest specifications cycle. When a stock is declared rebuilt, the default HCR used for healthy stocks managed under the PCGFMP (i.e., ACL equal to the ABC with a P* of 0.45) would be applied, unless modified by the Council. For information on the long-term projected impacts of the default HCR, see section 4.8.4.3 of the 2015 EIS.

Because darkblotched rockfish is an overfished species managed under a rebuilding plan, Alternative 1 would continue to manage the stock under the current rebuilding plan (

Table 4-2. Big skate trip limits for the Shorebased IFQ Program under Alternative 1 and 2.

with a prescribed SPR of 64.9 percent and updated 2017/2018 ACLs of 406 mt and 419 mt (Table 4-1). The Alternative 1 ACLs would be lower than the Alternative 2 ACLs because the Alternative 2 ACLs would apply the healthy stock default HCR, resulting in higher ACLs. Under Alternative 1, there would be less available darkblotched rockfish catch, which could leave more fish in the water with the potential to increase the overall darkblotched biomass. Because the stock is projected to be rebuilt by the start of 2016, there would be no difference in the projected rebuilding time between Alternative 1 and Alternative 2. Further, because Alternative 1 would not likely result in fishery changes that would affect other stocks, nor would it likely result in changes in fisheries that target darkblotched rockfish, and there is no indication that fishing operations would be likely to interfere substantially with, or to disturb, reproductive behavior or juvenile survival., no significant impacts on darkblotched rockfish would be likely under Alternative 1.

Table 4-3 Alternative 1 darkblotched rockfish rebuilding plan parameters with updated 2017ACL based on SPR 64.9 percent.

Species	B_0	B_{MSY}	T_{MIN}	$T_{F=0}$	T_{MAX}	T_{TARGET}	2017/2018 Alternative 1 Annual Catch Limit (ACL)	Harvest Control Rule Specification
Darkblotched rockfish	32,800 mt	13,112 mt	2012	2016	2037	2025	406/419 mt	SPR 64.9%

T_{TARGET} target year

4.1.1.2.3 Pacific Ocean Perch

Similar to darkblotched above, Alternative 1 for POP would continue the current rebuilding plan with a prescribed SPR of 86.4 percent and 2017/2018 ACLs of 171 mt and 176 mt (Table 4-4). For information on the long-term projected impacts of the default HCR, see Section 4.8.4.5 of the 2015 EIS.

The last full assessment was prepared in 2011, and it estimated a stock depletion of 19.1 percent at the start of 2011 (Hamel and Ono 2011). For 2017-2018, no stock assessment was completed for POP; however, the 2011 rebuilding analysis was updated with actual catches from 2011 to 2014.

In general, attainment for POP has been below the ACL, and fishing practices under Alternative 1 would be unlikely to have any effect on stock productivity, given the low fishing mortality levels anticipated under this alternative. There is no indication that fishing operations would be likely to interfere substantially with, or to disturb, reproductive behavior or juvenile survival. Changes in fishing behavior that would affect other biological resources would also not be expected. Therefore, there would be no significant impacts anticipated under Alternative 1.

Table 4-4. Alternative 1 POP rebuilding plan parameters with updated 2017ACL based on SPR 86.4 percent.

Species	B_0	B_{MSY}	T_{MIN}	$T_{F=0}$	T_{MAX}	T_{TARGET}	2017/2018 Alternative 1 ACL	Harvest Control Rule Specification
POP	37,780 mt	15,112 mt	2017	2018	2071	2051	171/176 mt	SPR 86.4%

4.1.1.3 ESA-Listed and Protected Species

NMFS reinitiated consultation on salmon in 2013. This consultation is not yet complete. Since the 2015 EIS, NMFS also reinitiated consultation on eulachon and short-tailed albatross. Consultation on these three species was initiated due to take that exceeded the ITS amounts in the NMFS and USFWS BiOps (NMFS 2015; USFWS 2012). The effects of Alternative 1 on salmon, eulachon, and short-tailed albatross would not be expected to be significant because, while there have been ITS exceedances, the harvest specifications under Alternative 1 would not be anticipated to change the fishery in a manner that would increase impacts on these species to a significant level. Further, as stated by the Council's ESA Workgroup, the exceedances for eulachon and short-tailed albatross are likely due to increasing populations, rather than changes in the fishery.

For the other listed species not cited above, impacts from the Alternative 1 harvest specification alternatives on ESA-listed and protected species have not significantly changed since the 2015 EIS. See Chapter 4.6 of the 2015 EIS for the effects of the fishery on ESA-listed and protected species. Under Alternative 1, the current seabird streamer lines requirement and inseason salmon impact reduction tools (closed areas) would be available to reduce possible increased impacts inseason. Therefore, no significant impacts, beyond those previously analyzed in the EIS, would be anticipated under Alternative 1.

4.1.1.4 Socioeconomic Resources

The impacts on socioeconomic resources have not significantly changed since the 2015 EIS. See Chapter 4.3 of the 2015 EIS for the effects of the fishery on socioeconomic resources.

The ACLs and resulting sector allocations under Alternative 1 for darkblotched rockfish, widow rockfish, and POP would be lower than under Alternative 2. This would result in less available harvest for sectors that target these stocks. However, the socioeconomic impacts of the differences between Alternative 1 and Alternative 2 would not likely be significant, and the impacts from both alternatives would be within the range of impacts in the 2015 EIS.

For POP, the difference between the alternatives would not likely be significant due to the low attainment of the species (i.e., a higher ACL would be unlikely to result in higher catch given the historical fishing pattern of low landings relative to the ACL). For widow rockfish, Alternative 1 would result in lower trawl and non-trawl fishery allocations than Alternative 2. Widow rockfish allocations are 91 percent to the trawl fishery and 9 percent to non-trawl. The difference between the allocations would not likely be significant, but Alternative 1 could restrict the trawl fisheries' ability to access Pacific whiting, as well as to participate in the emerging mid-water non-whiting fishery because both fisheries catch widow rockfish. Therefore, a lower allocation could result in decreased ability to land other species in those fisheries if the widow allocation were attained. For darkblotched rockfish, Alternative 1 would result in lower trawl and non-trawl fishery allocations compared to Alternative 2. Darkblotched rockfish is allocated 95 percent to the trawl fishery and 5 percent to the non-trawl fishery. The difference between the allocations would not be significant, but Alternative 1 could restrict the trawl fisheries' ability to access Pacific whiting compared to Alternative 2. Therefore, no significant impacts to the socioeconomic environment would be anticipated under Alternative 1.

4.1.2 Alternative 2 (Preferred Alternative)

Alternative 2 contains the preferred harvest specifications for widow rockfish, big skate, darkblotched rockfish, and POP. Because the proposed action in this EA is a subset of the Council's 2017-2018

biennial harvest specifications and management measures action (which implements harvest specifications for more than 90 species and management measures for all of the groundfish trawl, non-trawl, recreational, and non-groundfish commercial fisheries that incidentally catch groundfish), the economic sections below evaluate the impacts of that action at the sector level. The sections do not have specific data models that predict the impacts of the harvest specifications for the four species in this EA.

4.1.2.1 Physical Resources, including EFH

Under Alternative 2, the impacts on the physical environment have not significantly changed since the 2015 EIS. This section discusses possible negative, yet not significant, effects from the increased widow rockfish ACL. See Chapter 4.4 of the 2015 EIS for the effects of the fishery on EFH.

There are habitat implications associated with the increased ACL for widow rockfish. There has likely been substantial habitat recovery within Rockfish Conservation Areas (RCAs) stemming from prohibition on bottom trawling and low ACLs for pelagic rockfish complex species since 2002. Increased midwater trawling for pelagic rockfish species within RCAs would likely result in occasional (but increased) gear contacts with bottom habitats, hard-bottom habitat in particular, which is where pelagic rockfish are typically found. However, the rate of contact would probably be low (likely 7 percent or less of tows) and lower yet than has been observed in the whiting fishery (8 percent or less of tows) because the midwater fishery primarily drags their gear in the midwater column rather than on the bottom.

There are important disincentives associated with gear contact with demersal habitats (NMFS 2014). These include the high cost of net repair or replacement if the net is damaged, as well as reduced fishing efficiency and increased operating costs that occur when the net makes contact with the ocean bottom. Implemented gear restrictions further reduce the incentive to make bottom contact with midwater gear. These restrictions include the bare footrope requirement on all midwater nets and the requirement for large mesh webbing between the net opening and the main fishing net. Catch share implementation would be likely to consolidate fishing with fewer boats than in the past. This might result in further reduction in midwater gear contacts with demersal habitats because the more efficient vessels would likely be doing most of the fishing. The most efficient vessels would also likely substantially avoid bottom contact due to the deleterious impacts of such contact. Therefore, there could be possible negative, yet insignificant, impacts on the physical environment under Alternative 2.

4.1.2.2 Biological Resources

Big Skate

The Alternative 2 harvest specifications for big skate would set the ACL at 494 mt in 2017 and 2018. Because this proposal is inextricably linked to the proposed new management measure to manage big skate actively, the impacts of these proposals are addressed together here.

When the Council considered designating all skates except longnose skate as EC species during the 2015-2016 biennial cycle, the GMT estimated that catches of big skate averaged 95 mt from 2007 to 2011 with large landings of Unspecified Skate (Table 4-33; 2015 EIS). Subsequent analysis of Oregon port sampling data (PFMC 2016) not available when the Council considered the EC designation indicated that approximately 98 percent of the recent Unspecified Skate landings in Oregon consisted of big skate. The GMT revised the total mortality estimates of big skate coastwide using these new data (Table 4-5). Such large landings indicate that targeting of big skate occurred, and an EC designation was not warranted.

Table 4-5. Total mortality (mt) of big skate by sector in West Coast fisheries from 2010 to 2015. (PFMC 2016).

Sector	2010	2011	2012	2013	2014	2015
Incidental OA						
Landings	3.0	5.2	1.1	3.8	2.0	3.8
Discards	0.0	0.6	0.1	0.0	0.0	0.0
Total	3.0	5.7	1.1	3.8	2.1	3.8
Non-Trawl						
Landings	16.2	9.7	3.3	6.4	8.9	3.3
Discards	1.6	2.7	6.7	5.1	3.3	3.3
Total	17.8	12.4	10.1	11.5	12.2	6.6
Trawl						
Landings	173.2	236.1	227.7	123.6	354.3	276.7
Discards	28.8	35.9	30.6	36.5	43.8	43.8
Total	202.0	272.0	258.3	160.1	398.1	320.4
Tribal						
Landings	3.8	5.5	12.4	10.3	9.7	16.9
Discards	0.1	0.1	0.0	0.0	0.0	0.0
Total	3.8	5.5	12.4	10.3	9.7	16.9
Total All Sectors	226.6	295.7	281.8	185.8	422.1	347.8

The SSC-endorsed OFL of 541 mt was calculated by applying approximate MSY harvest rates to estimates of stock biomass from the NWFSC West Coast Bottom Trawl Survey (Agenda Item H.6.a, Supplemental Attachment 6, November 2013). The survey-based biomass estimate is likely low since big

skate are distributed to the shore, and no West Coast trawl surveys have been conducted shallower than 55 m. This adds a level of precaution to the management of big skate, with stock-specific management reducing uncertainty and the risk of overfishing the stock. Trip limits, which are designed to keep catch within the harvest specifications, are discussed in section 4.2.2.1.

During the 2015-2016 harvest specifications process, the Council considered managing big skate in a complex with longnose skate, the other actively managed West Coast skate species, but the two species have disparate distributions and fishery interactions (longnose is more deeply distributed than big skate); thus, that option was not endorsed. The Council chose to set the ACL equal to the ABC with a P* of 0.45, which is the default HCR for healthy stocks.

Under Alternative 2, trip limits for big skate in the Shorebased IFQ fishery would be the same as those under Alternative 1. Sorting requirements would be expanded to include all trawl and non-trawl fisheries, and big skate trip limits would be designated as a routine action. This would mean that trip limits could be implemented inseason if they were needed in a fishery other than the Shorebased IFQ fishery. Trip limit adjustments are already available for routine inseason adjustment for the Shorebased IFQ fishery, and they would be applied under Alternative 1. Alternative 2 would have potential positive effects because NMFS could keep catch within the new harvest specifications, which are set at a sustainable level. With increased sorting, there would be more species-specific catch data, which could help inform future stock assessments. The risk of overfishing would be low, as the estimated mortality would be within the new harvest specifications. The management uncertainty would be low, since big skate is a trawl-dominant species with mandatory 100 percent observer coverage in trawl fisheries. No other groundfish would likely be affected by this alternative. Therefore, there would be no significant impacts under Alternative 2.

Widow Rockfish

The Alternative 2 ACL of 13,508 mt in 2017 and 12,655 mt in 2018 would be derived by applying the healthy stock default HCR of ACL equals ABC (P* equals 0.45). Because the default HCRs established under Amendment 24 use the HCR from the previous year as the default, Alternative 1 would have the same OFL and ABC values, but would continue the 2,000- mt constant catch ACL. If Alternative 2 were implemented, this would establish a new default for widow rockfish that would apply, unless the Council recommended changing it through a future biennial harvest specifications cycle.

Abundance-based reference points are defined in the Groundfish FMP. For each species with a stock assessment, a depletion level is estimated, which is the current biomass relative to its unfished stock biomass (i.e., the higher the depletion percentage, the healthier the stock and the larger the stock

biomass). The 2015 widow rockfish assessment estimated depletion to be at 75.1 percent at the start of 2015, and the stock biomass has increased steadily since a low depletion of 37.3 percent in 1998 (Hicks and Wetzel 2015). Increases in stock size are due to the low level of harvest and strong recruitments in 2008 and 2010. The data were revised numerous times for the current stock assessment, including the following:

1) A new method of index standardization for NWFSC trawl survey using a geostatistical delta-GLMM model (Figure 4-1)
2) A new steepness value (0.798) based on an updated meta-analysis of steepness
3) A prior distribution developed for the natural mortality parameter from an analysis of a maximum age of 54 years
4) Updated methods of expanding fishery length and age composition, as well as survey conditional age at length
5) New ageing error tables

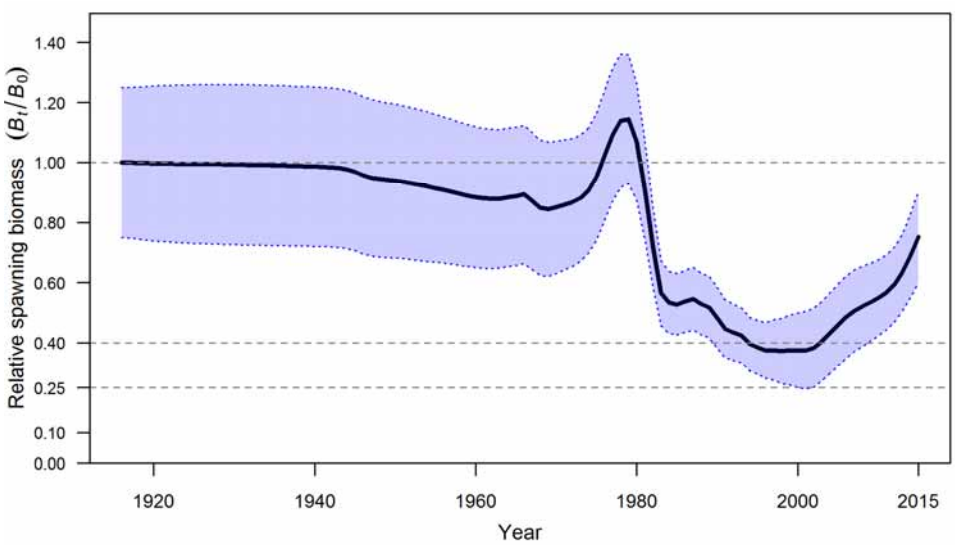


Figure 4-1. Estimated relative spawning biomass (depletion) with approximate 95 percent asymptotic confidence intervals (filled area) for the base-case widow rockfish assessment model.

For this assessment, there was a more thorough investigation of available age and length data, increasing the amount of these data relative to previous assessments. In addition, Washington historical landings were reconstructed. The SSC recommended this as a category 1 assessment and indicated that the proxy category 1 sigma of 0.36 should be used to determine the ABC buffer. The previous 2011 assessment (He et al. 2011) results were considered relatively less certain, and the previously assigned sigma value was 0.41.

The Alternative 1 ACL of 2,000 mt per year was previously adopted due to uncertainty in the 2011 assessment. The 2015 assessment results indicate a more certain and optimistic perception of current stock depletion (Figure 4-2). The risk to the stock of changing the HCR from Alternative 1 (constant catch 2,000 mt annually) to Alternative 2, the highest ACL allowed in the FMP harvest specification framework (ACL equals ABC under a P* of 0.45), would likely be low with a predicted depletion of 56 percent in 2026 (Table 4-6 and Figure 4-2). The Council used the healthy stock P* value as a precautionary reduction between the OFL and the ABC to account for scientific uncertainty. This reduction is applied after the Council's SSC applies a reduction for uncertainty in the biomass estimates in the stock assessment. Therefore, while a P* of 0.45 represents the highest ACL allowed under the harvest specifications framework, there are many layers of precaution built into the ACL calculation.

Table 4-6. Projected spawning biomass and depletion of widow rockfish under the low state of nature and base models in the 2015 assessment assuming removals under alternative HCRs.

				State of nature			
				Low		**Base case**	
Relative probability of ln(SB_2013)				**0.25**		**0.5**	
Harvest Control Rule	**Year**	**OFL (mt)**	**ACL (mt)**	**Spawning biomass (mt)**	**Depletion**	**Spawning biomass (mt)**	**Depletion**
Alternative 1 (ACL = 2,000 mt)	2015	12,259	2,000	48,360	59%	60,608	75%
	2016	13,368	2,000	51,094	62%	64,599	80%
	2017	14,130	2,000	53,178	64%	67,674	84%
	2018	14,511	2,000	54,831	67%	69,856	87%
	2019	14,746	2,000	56,417	68%	71,533	89%
	2020	14,966	2,000	58,025	70%	72,892	90%
	2021	15,132	2,000	59,510	72%	73,866	92%
	2022	15,200	2,000	60,750	74%	74,413	92%
	2023	15,179	2,000	61,745	75%	74,604	92%
	2024	15,108	2,000	62,549	76%	74,556	92%
	2025	15,017	2,000	63,222	77%	74,369	92%
	2026	14,924	2,000	63,805	77%	74,110	92%
Alternative 2 (ACL = ABC (P* =0.45))	2015	12,259	2000	48,360	59%	60,608	75%
	2016	13,368	2000	51,094	62%	64,599	80%
	2017	14,130	13,508	53,178	64%	67,675	84%
	2018	13,237	12,655	48,794	59%	63,900	79%
	2019	12,375	11,830	45,047	55%	60,314	75%
	2020	11,714	11,198	42,188	51%	57,284	71%

				State of nature			
				Low		**Base case**	
Relative probability of ln(SB_2013)				**0.25**		**0.5**	
Harvest Control Rule	**Year**	**OFL (mt)**	**ACL (mt)**	**Spawning biomass (mt)**	**Depletion**	**Spawning biomass (mt)**	**Depletion**
	2021	11,181	10,689	39,951	48%	54,659	68%
	2022	10,691	10,221	38,060	46%	52,260	65%
	2023	10,235	9,784	36,431	44%	50,080	62%
	2024	9,835	9,402	35,056	43%	48,173	60%
	2025	9,502	9,083	33,908	41%	46,561	58%
	2026	9,232	8,826	32,943	40%	45,225	56%

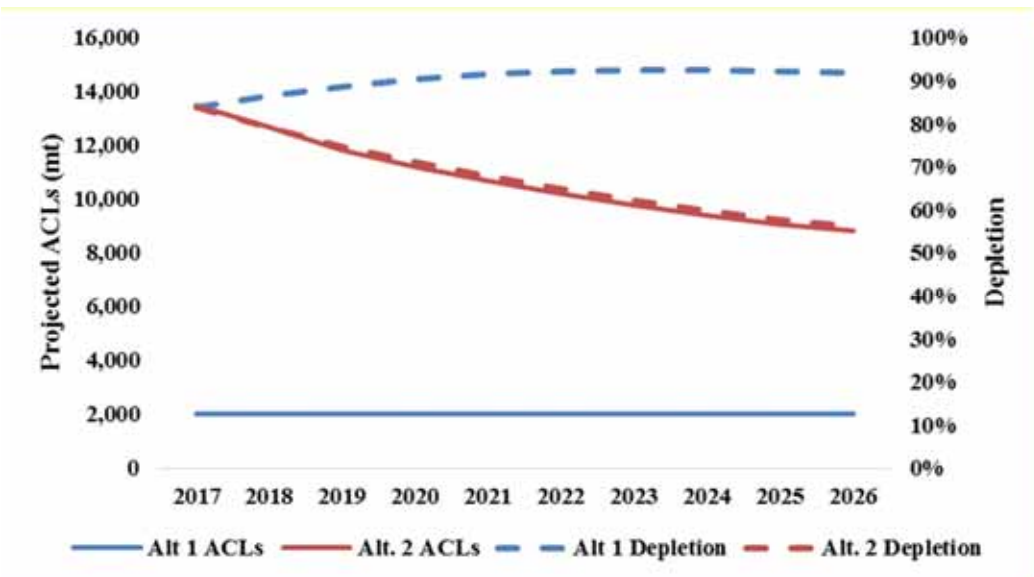


Figure 4-2. Ten-year projections of annual catch limits and depletions for widow rockfish under alternative HCRs assuming the base model in the 2015 assessment.

The stock is projected to remain healthy (i.e., at or above the B_{40} percent biomass target) for the next 10 years, even under the more pessimistic and less likely low state of nature model provided in the 2015 assessment (Figure 4-1; Table 4-6). The risk of overfishing is low, given the more certain, optimistic assessment results and the low management uncertainty. Management uncertainty is low since widow rockfish is a trawl-dominant species, and there is mandatory 100 percent observer coverage in trawl fisheries. Widow rockfish was historically a target species, and a higher ACL would allow the

development of fisheries for this and co-occurring stocks such as yellowtail rockfish. Therefore, there would be no significant impacts under Alternative 2.

Darkblotched rockfish

The 2015 darkblotched assessment predicted that the stock would successfully rebuild by the start of 2016. Given that the stock is just under the B_{MSY} target, as well as the prediction of imminent stock recovery, and because the low yields available under the darkblotched rebuilding plan have severely constrained access to healthy stocks, the Council amended the rebuilding plan by relaxing the harvest rate. The Council adopted ACLs for 2017 and 2018 of 641 mt and 653 mt. The ABC of 641 mt is a 4.4 percent reduction from the OFL (σ=0.36/P*=0.45), because it is a category 1 stock. The ACL is set equal to the ABC, as the stock is projected to be above its target biomass of $B_{40\%}$. An update assessment of darkblotched is planned for 2017 to confirm the prediction the stock is successfully rebuilt. The HCR of setting the ACL equal to the ABC under a P* of 0.45 is the highest ACL that can be considered given the harvest specification framework outlined in the FMP.

The predicted status of darkblotched rockfish in the next 10 years associated with the alternative HCRs analyzed for 2017 and beyond indicate that the stock will remain healthy with depletion above 40 percent (Figure 4-3). Depletion in 2026 under the Alternative 1 ACL would be predicted to be 55 percent, and that under the Alternative 2 ACL alternative would be predicted to be 50 percent.

Alternative 2 was developed to increase the darkblotched rockfish ACL by applying the healthy stock default HCR, even though the stock is just under the rebuilt threshold, to mitigate potential negative fishery impacts in 2017 and 2018, given increasing fishery encounters of darkblotched in trawl fisheries. This was considered a reasonable action in light of the optimistic rebuilding prospects for darkblotched rockfish (rebuilding probabilities are 100 percent for all HCR alternatives).

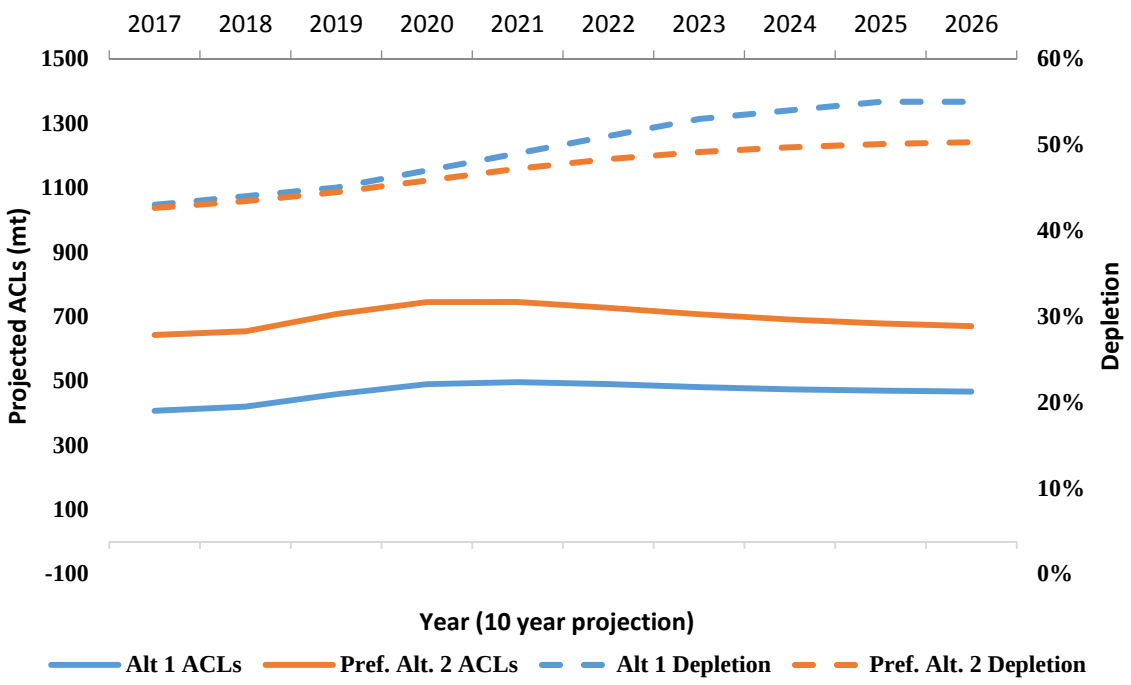


Figure 4-3. Ten-year projections of annual catch limits and predicted depletions for darkblotched rockfish under alternative HCRs.

The 2015 darkblotched rockfish assessment predicted that the stock would be rebuilt by the start of 2016. Therefore, rebuilding probabilities (both P_{MAX} and P_{TARGET}) are high for darkblotched rockfish under the HCR in the rebuilding plan. The SSC recommends that a new assessment be done in 2017 to confirm that prediction.

Fishery impacts on darkblotched rockfish come largely from the Pacific whiting fishery because most darkblotched rockfish is landed by Pacific whiting sectors. A low available catch of darkblotched rockfish has previously restricted the catch of Pacific whiting. The increased ACL under Alternative 2 would allow greater access to Pacific whiting; it would, therefore, also likely result in higher catches of darkblotched rockfish from the Pacific whiting fisheries. However, any increase would not likely be significant, because Pacific whiting would still be managed with the internationally set TAC amounts, regardless of the darkblotched rockfish ACL.

Therefore, because the harvest specifications for darkblotched rockfish under Alternative 2 would not extend rebuilding, there is no indication that fishing operations would be likely to interfere substantially with or to disturb reproductive behavior or juvenile survival, and, because the stock is predicted to be rebuilt with a high probability in 2016, there would be no significant impacts under Alternative 2.

Pacific Ocean Perch

Alternative 2 would depart from the default HCR in the POP rebuilding plan for the next two years by specifying a 281-mt ACL in 2017 and 2018 before resuming with the default HCR (SPR 86.4 percent) in 2019. Alternative 2 would address an emerging bycatch problem that disrupted 2016 trawl fisheries.

A POP catch report was provided in 2013 (Agenda Item F.5.a, Attachment 10, June 2013). The report indicated that 2010 to 2012 total catches were below specified ACLs/OYs. A POP catch report provided in 2015 (Agenda Item D.8, Attachment 9, June 2015) also indicated that 2012-to-2014 total catches were at 38 percent of the aggregate allowable catch over that period. A catch-only update of the 2011 POP rebuilding analysis was prepared (Agenda Item I.4, Attachment 7, November 2015) to inform harvest specifications for 2017 and beyond.

POP are caught almost exclusively by groundfish trawl gear and predominantly by bottom trawls operating on the outer continental shelf and slope north of 43° N. latitude. POP are distributed from 30 to 350 fm, with the core distribution between 110 and 220 fm.

According to the base model in the 2011 assessment, the fishing level has been below the proxy $F_{50\%}$ F_{MSY} harvest rate for the past 12 years (Figure 4-4), during which time the stock has begun to rebuild. The point estimates of summary (age 3+) biomass also show an upward trend over the past decade, increasing approximately 50 percent in that time.

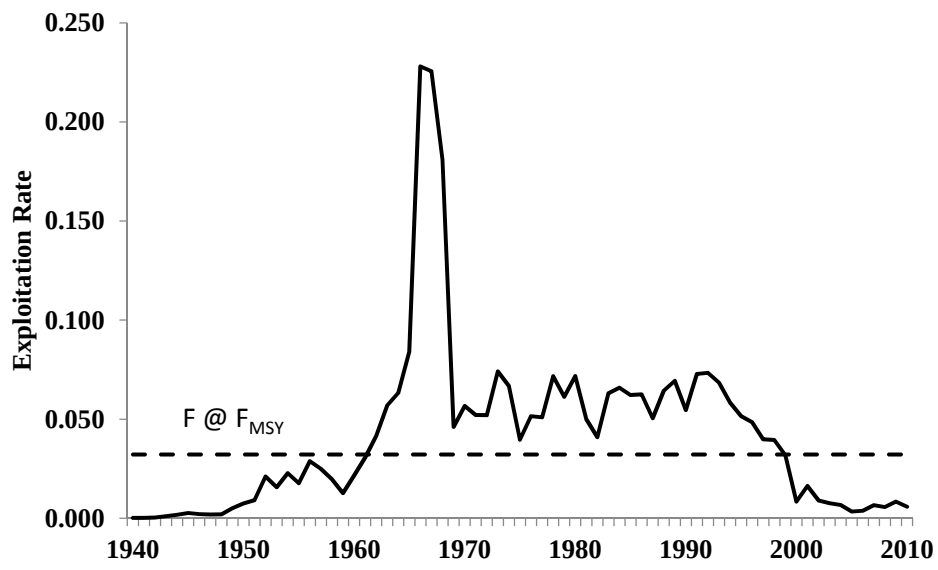


Figure 4-4. Time series of POP exploitation rates (catch/summary biomass), 1940 to 2010.

Hamel (2011) estimated a probability of rebuilding in the maximum time allowable (P_{MAX}) under the SPR harvest rate specified in the rebuilding plan of 73.2 percent. There is a 50 percent probability of rebuilding by the target year of 2051. The probability of rebuilding by the target year did not change with the 2015 catch-only update of the 2011 rebuilding analysis. However, the P_{MAX} did change slightly from 73.2 percent to 73.6 percent.

Table 4-7 and Figure 4-5 show projections for POP ACLs under Alternative 1 and Alternative 2. Under Alternative 2, the projected ACLs from 2019 to 2026 either are the same as those under Alternative 1 or are slightly lower; this is because of the two-year departure from the current default HCR in 2017-2018. Alternative 2 would also result in a slight increase (less than 1 percent) in rebuilding probabilities. The target year and long-term (i.e., 2019 to 2051) HCR prescribed in the current POP rebuilding plan would remain unchanged; only the HCR would change in 2017-2018. A new assessment will be conducted for this stock next year.

Table 4-7. Annual catch limit projections for POP under alternative HCRs, 2017 to 2026.

Year	ACLs (mt)	
	Alternative 1	**Alternative 2**
2017	171	281
2018	176	281
2019	179	178
2020	182	182
2021	185	185
2022	189	188
2023	192	192
2024	195	195
2025	199	198
2026	203	203

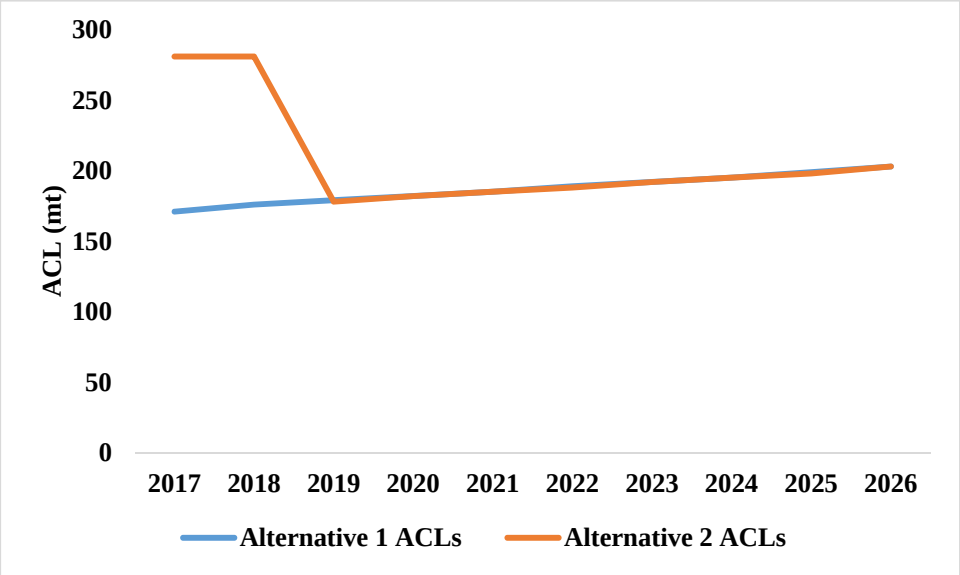


Figure 4-5. Trends in the annual catch limits for POP under alternative HCRs.

Alternative 2 would not likely have significant impacts on other groundfish species. Like darkblotched, there may be an increased catch of Pacific whiting with an increase in the POP ACL because POP is caught primarily in the trawl fishery; however, any increase would not likely be significant because Pacific whiting would continue to be managed consistent with the internationally set TAC. Therefore, because Alternative 2 would represent a short-term departure from the rebuilding plan HCR, would not substantially extend the median time to rebuild, would decrease the probability of rebuilding by target

year (T_{TARGET}) by less than 1 percent, would not likely substantially interfere with or disturb reproductive behavior or juvenile survival, and would provide relief to the affected fisheries, there would be no significant impact from Alternative 2.

4.1.2.3 ESA-Listed and Protected Species

Section 3.2.3 contains information regarding the NMFS and USFWS 2012 BiOps and their conclusions regarding the ongoing operation of the PCGFMP. This information is, therefore, not repeated here.

As stated in section 3.2.3, the NMFS 2012 BiOp covers many species that are not discussed in this EA. The species are not discussed because there is no information to indicate that the Alternative 2 harvest specifications would change the timing, gear, or area of any groundfish fishery in a manner that would result in any significant impacts to those species.

As described in 3.2.3, the Council's ESA Workgroup reviewed recent catch information for all of the species included in the NMFS BiOp and short-tailed albatross and made recommendations. Following the ESA Workgroup's recommendations on reinitiation, NMFS reinitiated ESA section 7 consultation on eulachon and short-tailed albatross. In 2013, NMFS reinitiated section 7 consultation to address the effects on salmonids caused by the emerging use of midwater trawl gear to target non-whiting groundfish species such as yellowtail and widow rockfish. Additionally, in October 2014, the midwater trawl fishery exceeded the reinitiation triggers of 11,000 Chinook and 0.05 Chinook salmon/mt of whiting. NMFS reinitiated ESA consultation on the effects on listed salmonids of all fishing under the PCGFMP, including the whiting and non-whiting fisheries and all fishing gear types. The impacts from the preferred harvest specifications on salmon, eulachon, and short-tailed albatross are discussed below. As stated above, the other listed species included in the NMFS and USFWS 2012 BiOps are not discussed further in this EA.

Salmon

The bycatch of salmonids in the groundfish trawl fisheries is primarily Chinook salmon. The 1999 Biological Opinion on Fishing Conducted under the Pacific Groundfish Fishery Management Plan for the California, Oregon, and Washington Groundfish Fishery (NMFS 1999) and related consultations acknowledged that bycatch of Chinook salmon in the whiting fishery would occasionally exceed 11,000 and still reached no jeopardy conclusions because the expected catch in the whiting fishery was low relative to the catch in the salmon fisheries. In addition, the management of the whiting fishery (late start date, closed areas, intensive monitoring) was likely to result in impacts that were estimated to be low and

"within the numerical range anticipated during the original analysis" (NMFS 1999). In its conclusion of no jeopardy, the 1999 BiOp also considered that catch in the bottom trawl and whiting fisheries (the only midwater trawl fishery active at the time), could reach 9,000 and 11,000 fish respectively. Total catch of Chinook has generally been well below these thresholds, as shown in Table 4-8.

Table 4-8. Number of Chinook salmon caught annually in Pacific Coast trawl fisheries.

Year	**Pacific whiting ^** (Midwater; 11,000 incidental take statement)	**Limited Entry #** (Bottom; 6,000-9,000 incidental take statement)	**Total**
2005	11,956	1,242	13,198
2006	3,962	175	4,137
2007	6,179	317	6,496
2008	3,376	399	3,775
2009	2,742	299	3,041
2010	4,389	70	4,459
2011	8,622	175	8,797
2012	6,559	304	6,863
2013	6,077	323	6,400
2014*	14,395	872	15,267
2015*	4,310	773	5,083

Based on an NWFSC Groundfish Observer Program Data report titled "Observed and Estimated Total Bycatch of salmon in the 2002-2013 US West Coast Fisheries," Table 30. Also called NWFSC salmon total mortality report.

* 2014 and 2015 data are preliminary data until the NWFSC total mortality report is published. The preliminary data do not include potential at-sea discards in whiting sectors (MS, C/P, shorebased IFQ), nor expansions for some hauls for shoreside non-whiting. However, adjustments based on final data are expected to be minimal because of the high observer coverage (100 percent) in the trawl fisheries since 2011.

^ Pacific whiting fishery Chinook bycatch numbers include MS, C/P, and shorebased whiting fisheries, as well as tribal and whiting EFP landings. Since 2011, salmon catch in the Pacific whiting fishery also includes any landings with midwater trawl gear targeting groundfish other than whiting (i.e., non-whiting midwater trawl fishery).

Limited entry fishery Chinook bycatch numbers include all bottom trawl, including limited entry bottom trawl and California halibut bottom trawl.

Re-emergence of the mid-water trawl rockfish fishery

During the 1980s and 1990s, there was a considerable mid-water trawl fishery for widow, yellowtail, and canary rockfishes (i.e., annual trawl landings were 5,000 to 37,000 mt). The fishery has been relatively small since the early 2000s, due to both canary rockfish and widow rockfish being declared overfished. However, the mid-water rockfish fishery is expected to re-emerge in 2017-2018 for the following reasons:

1. The ~6.5-fold increase in the widow rockfish ACL under Alternative 2 (i.e., from 2,000 mt to ~13,000 mt), which would increase the combined IFQ allocation of the targets (i.e., widow and yellowtail rockfishes) to ~15,000 mt.
2. Since recent IFQ take of these targets has only been ~2,000 mt, there will be an extra ~13,000 mt extra to pursue.
3. Canary rockfish, which have constrained the fishery in the past, were declared rebuilt, and the resulting increased IFQ allocation (~1,000 mt) is no longer expected to be constraining (per GMT bycatch rate modeling).

Chinook salmon impacts associated with re-emergence of the mid-water rockfish fishery were projected using a bycatch rate model and a bootstrap model. Both models applied tow-level bycatch data of Chinook salmon from observed mid-water rockfish trips (non-whiting) from 1996 to 2013 to the predicted number of mid-water tows the IFQ fishery will make in the future to access their target allocations of widow and yellowtail rockfishes. Since future IFQ attainments of these targets are uncertain, and will affect the number hauls that will be conducted, potential Chinook salmon impacts were modeled for four alternative attainments of widow and yellowtail rockfishes: (1) 100 percent; (2) 87 percent (i.e., the IFQ model projection); (3) 50 percent; and (4) 13 percent (if the current attainment of 2,000 mt stays the same).

As seen in Figure 4-6, projected Chinook salmon bycatch associated with re-emergence of the mid-water rockfish trawl fishery will be heavily contingent on the uncertain future attainment rates of widow and yellowtail rockfishes. Increases in widow rockfish ACLs under Alternative 2 might allow more fishing with midwater gear, which would have the potential to increase catch of salmonids species over Alternative 1. Figure 4-6 shows the IFQ model prediction (87 percent yellowtail and widow attainment). Chinook take would likely be higher than under Alternative 1 (13 percent current attainment seen in Figure 4-6). The exact amount of increase in Chinook take under Alternative 2 would depend on a variety of factors. These factors would include, but would not be limited to, the effort shift from bottom trawl to the midwater gear and the availability of salmonids to intercept (time and area overlap with target species). However, under all circumstances, projected bycatch of Chinook salmon would likely be within 6,000 fish ITS amount. Since impacts from the other non-whiting fisheries have been less than 1,000 Chinook salmon per year since 2005, the non-trawl fisheries would likely remain within their 9,000 ITS amount (per the current Salmon BiOp). Because trawl vessels have full observer coverage (all vessels currently carry observers on all trips), incidental catch would be monitored to determine whether any future reinitiation thresholds identified in the upcoming ESA Section 7 BiOp for the groundfish fishery were exceeded.

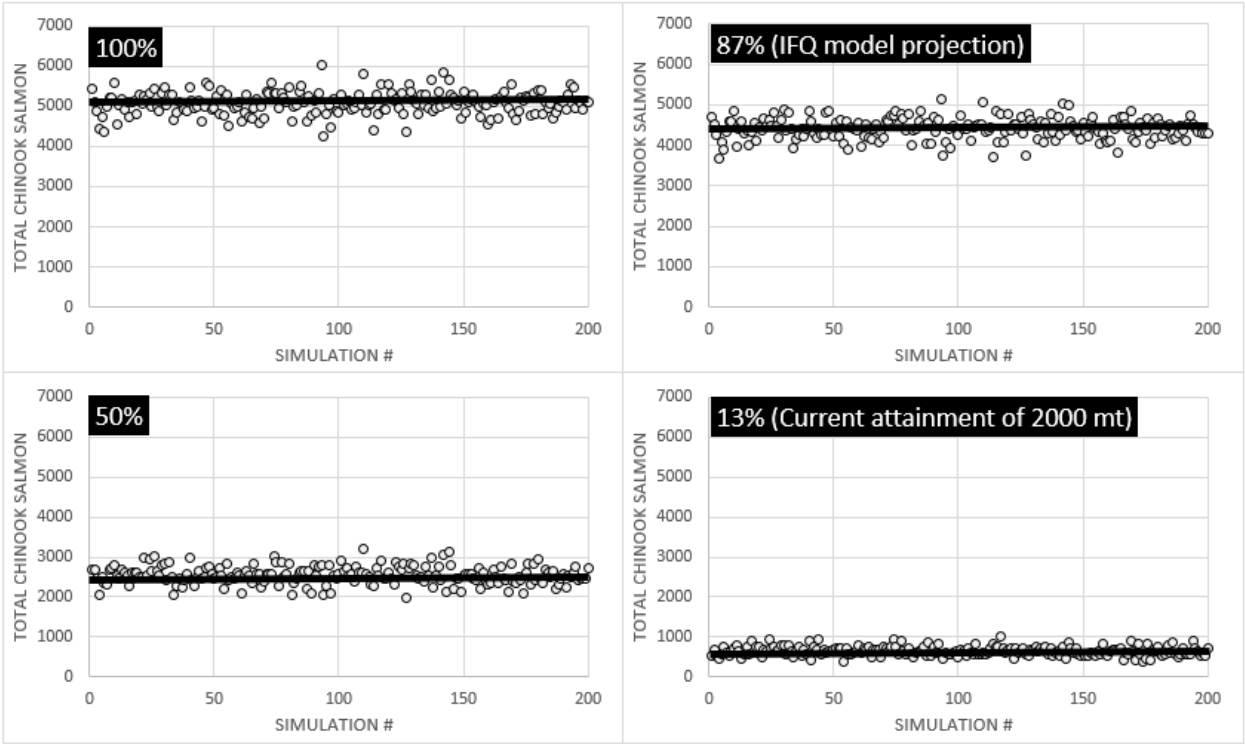


Figure 4-6. Projected Chinook salmon bycatch in the IFQ fisheries for alternative attainment rates of widow and yellowtail rockfishes from a bycatch rate model (solid black line) and a bootstrap model (each dot is the total for a simulated season; there are 200 simulated seasons). All predictions are within the 9,000 Chinook salmon threshold for the non-whiting fisheries from the current Salmon BiOp.

The impacts from Alternative 2 would not be significant, and they would likely be similar to those for Alternative 1. The impacts would be anticipated to be similar because, while the harvest specifications for darkblotched and widow rockfish would increase from Alternative 1 to Alternative 2, the fishery would be unlikely to change in a manner that would substantially interfere with or disturb reproductive behavior or juvenile survival of salmon. Further, impacts on salmon, while somewhat uncertain, would be expected to be low and "within the numerical range anticipated during the original analysis" (NMFS 1999) given the current management of the Pacific whiting fishery (closed areas, start date, gear). Finally, NMFS has the ability to impose further area restrictions for the at-sea whiting fishery should salmon catch increase, which would lessen potential impacts.

Eulachon

For eulachon, the ITS estimated that 1,004 fish would be caught in the groundfish fishery. 1,004 fish is the sum of the highest catch from 2002 to 2010 from each of the limited entry trawl, tribal MS, non-tribal MS, and C/P fisheries. The NMFS BiOp anticipated that the ITS was sufficient to capture catch in these

fisheries because these maximum bycatch numbers were never reached in the same year. The highest total was from 2002 when 821 eulachon were captured as bycatch in the limited entry trawl fishery.

Recently catch of eulachon in the groundfish fishery exceeded the amount estimated in the ITS, largely due to catch in the Pacific whiting fisheries that are not part of the proposed action. NMFS subsequently analyzed eulachon bycatch in the Pacific Coast Groundfish Fishery in detail (Gustavson et. al. 2015). In its report, the Council's ESA Workgroup concluded that the exceedances of the eulachon ITS were most likely due to increases in the population and not to changes in the fishery. The ESA Workgroup recommended that NMFS reinitiate consultation.

The increased widow ACL under Alternative 2 might allow increased fishing with midwater gear, which would have the potential to increase catch of eulachon over Alternative 1. The amount of increase, if any, would depend on a variety of factors. These factors would include, but would not be limited to, the effort shift from bottom trawl to midwater gear and the availability of eulachon to intercept (time and area overlap with target species). Because trawl vessels have full observer coverage (all vessels currently carry observers on all trips), incidental catch would be monitored to determine whether reinitiation thresholds from the upcoming ESA Section 7 BiOp for the groundfish fishery were exceeded. Based on the overall magnitude of bycatch in U.S. West Coast groundfish fisheries, either there is limited interaction with eulachon in these fisheries, or most eulachon encounters result in fish escaping or avoiding trawl gear (Gustafson et al. 2016).

The harvest specifications for darkblotched rockfish, POP, and big skate under Alternative 2 would be unlikely to have significant adverse impacts on eulachon because these specifications would not be expected to the change the fishery in a manner that would alter the fishery timing, area, or gear, such that it would affect eulachon. Therefore, while there may be increased take of eulachon under Alternative 2, it would not likely be significant, because the population is increasing, most eulachon escape or avoid trawl gear, and any expected increase in take would likely be small compared to the increased population.

Short-tailed albatross

Section 3.5.2.3 of the 2015 EIS summarizes available information on species USFWS manages that are listed under ESA. As stated above, the Council's ESA Workgroup recommended that NMFS reinitiate consultation on short-tailed albatross due to an ITS exceedance. Since that time, NMFS implemented seabird avoidance measures that require the use of streamer lines on commercial fixed gear vessels 55 feet or greater in length. Similar to eulachon, the ESA Workgroup also acknowledged that development of an ITS that adapts to the size of the population would best serve the fishery, because it would not

unnecessarily restrict fisheries or reinitiate consultation when increased interactions result from a recovering population.

The harvest specifications under Alternative 2 would be unlikely to have significant adverse impacts on short-tailed albatross because these specifications would not be expected to the change the fishery in a manner that would alter the fishery timing, area, or gear, such that it would affect the fixed gear fishery, which is the fishery that has the largest impact on short-tailed albatross.

4.1.2.4 Socioeconomic Resources

This section evaluates the effects of the alternatives on fishery participants and fishing communities. Section 3.2 in the 2015 EIS describes the economic status of these affected groups during the baseline period used for that analysis (2003 to 2012) based on historical commercial landings data, estimates of recreational fishing activity, and census data. Updated baseline information may be found in the 2016 Groundfish SAFE (Council 2016).

Recreational fisheries are not discussed in this section because the groundfish species in Alternative 2 are not major targets or economic drivers for recreational fisheries, and recreational management measures are not part of the proposed action. POP, darkblotched rockfish, and widow rockfish are all allocated over 90 percent to the trawl fishery. Therefore, neither alternative is expected to have a significant impact on recreational fisheries. The 2017-2018 recreational season structures, bag limits, and closed areas will be published in the proposed and final rules for the 2017-2018 harvest specifications and management measures.

The Alternative 2 harvest specifications for big skate are not expected to have a significant impact on the fishery participants and fishing communities compared to Alternative 1 because there is no difference in the Shorebased IFQ fishery trip limits between the alternatives. While the change from EC species to in-the-fishery is a change in the way the stock is designated, functionally, no difference in the management of the species would be expected to affect fishery participants and fishing communities. Further, there would be no expected change in fishing behavior or access to the stock between the alternatives that would have significant socioeconomic impacts.

The Alternative 2 harvest specifications for POP would be unlikely to have a significant impact on the fishery participants and fishing communities compared to Alternative 1 because the attainment relative to the ACLs has been less than 50 percent. This means that, while more POP would be available under Alternative 2 than under Alternative 1, the increase would not result in significant impacts because much of the available yield would not be caught. The higher ACL under Alternative 2 would be expected to

increase access to Pacific whiting, which could have a positive impact on the Pacific whiting fisheries; however, the larger impact would come from the internationally set Pacific whiting TAC, which is unknown at this time.

The Alternative 2 harvest specifications for darkblotched rockfish would be unlikely to have a significant impact on the fishery participants and fishing communities compared to Alternative 1 because this species is primarily caught as bycatch in the trawl fishery, rather than being a target species. This means that, while more darkblotched rockfish would be available under Alternative 2, the increase would not result in significant impacts because the economic impacts on the trawl fishery come from other species. Under Alternative 1, the trawl fishery would have less ability to catch Pacific whiting than under Alternative 2. The higher ACL under Alternative 2 would be expected to increase access to Pacific whiting compared to Alternative 1, which could have a positive impact on the Pacific whiting fisheries. However, any positive impacts would largely be tied to the internationally set Pacific whiting TAC, which is unknown at this time.

The Alternative 2 harvest specifications for widow rockfish would be unlikely to have a significant impact on the fishery participants and fishing communities compared to Alternative 1. The low Alternative 1 ACL of 2,000 mt would reduce the trawl fisheries' access to whiting compared to the ACL of 13,508 mt under Alternative 2. Further, the emerging mid-water non-whiting fishery targets widow rockfish and yellowtail rockfish; therefore, there would be expected negative impacts on fishery participants under the lower Alternative 1 ACL due to less available widow rockfish.

Net revenues are calculated as the difference between the ex-vessel value of landings and the estimated costs incurred in achieving those landings..[5] Net revenue results are not provided for the shoreside whiting fishery for two reasons. First, whiting prices in the various scenarios for 2017 and 2018 are $.08 a pound; during the period for which there are economic data (2011 to 2014) to estimate variable costs in the IFQ fishery, whiting prices were $.10 to $.14 per pound. Since crewmembers typically receive a share of revenue with some deductions, this drop in whiting prices will likely have a substantial impact on crew costs, the largest variable cost category. However, this effect is not quantifiable at this time. Second, the NWFSC does not have enough economic data reflecting costs in the newly emerging non-whiting mid-water trawl fishery. Some scenarios for 2017 and 2018 assume the non-whiting mid-water trawl fishery is harvesting over 10 million pounds per year, whereas in 2014 (the most recent year of economic data) less

[5] These estimates are based on a comparison of landings revenues projected under the alternatives with landings and average costs reported in economic data reports (for IFQ sectors) and on cost-earnings surveys of samples of vessels in the remaining groundfish sectors. Values reported are "total cost net revenues," which include prorations of certain estimated fixed-cost components in addition to the variable costs directly associated with each groundfish fishery sector.

than 2 million pounds of non-whiting were landed with mid-water gear. Given the emerging nature of this fishery, it is likely that the NWFC's data will be substantially improved when 2015 data from trawl fishery participants are collected (which is due September 1, 2016).

Table 4-9 and

Table 4-10 compare ex-vessel revenue estimates under Alternative 2 to Alternative 1. Projections assume average ex-vessel prices observed in 2015. Effects are presented according to groundfish fishery sectors (see the 2015 EIS PFMC and NMFS 2015, Section 3.2.2) and are not specific to the species evaluated in this EA. Therefore, the estimates in the tables below likely exceed the impacts from the four species included in Alternative 2 in this document because they include all of the species in the 2017-2018 harvest specifications action.

Table 4-9. Estimated ex-vessel revenues by groundfish harvest sector under the alternatives (2015 $million).

	Alternative 1		**Alternative 2***	
	2017	**2018**	**2017**	**2018**
Shoreside Sectors:				
Whiting	13.3	13.3	**13.3**	**13.3**
Non-whiting Trawl+Non-trawl IFQ	40.1	40.0	**60.3**	**59.3**
Limited Entry Fixed Gear	16.0	16.7	**16.5**	**17.1**
Nearshore Open Access	4.7	4.7	**4.7**	**4.7**
Non-nearshore Open Access	4.4	4.5	**4.0**	**4.1**
Incidental Open Access	0.2	0.2	**0.2**	**0.2**
Tribal (incl. whiting)	9.8	9.9	**9.8**	**10.0**
Shoreside sectors' Totals	**88.5**	**89.3**	**108.8**	**108.7**
At-sea Sectors:				
Non Tribal Whiting	25.9	25.9	**25.9**	**25.9**
Tribal Whiting	5.1	5.1	**5.1**	**5.1**
At-sea sectors' Totals	**31.0**	**31.0**	**31.0**	**31.0**
TOTAL Groundfish Revenue	**119.5**	**120.4**	**139.8**	**139.7**

*Alternative 2 combines preferred ACLs with preferred management measures.

Table 4-10. Change in groundfish ex-vessel revenues from Alternative 1 by groundfish harvest sector under the action alternatives, 2017-2018 average (2015 $million).

	Alternative 1	**Alternative 2***
	2017-2018	**2017-2018**
Shoreside Sectors:		
Whiting	*13.3*	**-0.000**
Non-whiting Trawl+Non-trawl IFQ	*40.0*	**+19.753**
Limited Entry Fixed Gear	*16.3*	**+0.476**
Nearshore Open Access	*4.7*	**-0.042**
Non-nearshore Open Access	*4.5*	**-0.395**
Incidental Open Access	*0.2*	**+0.000**
Tribal (incl. whiting)	*9.9*	**+0.015**
Shoreside sectors' Totals	***88.9***	**+19.806**
At-sea Sectors:		
Non Tribal Whiting	*25.9*	**+0.0**
Tribal Whiting	*5.1*	**+0.0**
At-sea sectors' Totals	***31.0***	**+0.0**
TOTAL Groundfish Revenue	***119.9***	**+19.8**

*Alternative 2 combines preferred ACLs with preferred management measures.

Table 4-11compares projected shoreside commercial ex-vessel revenue under the alternatives to the annual average for the 2011 to 2015 baseline period. Revenue projections are more aggregated in these tables, and they do not include estimates for some of the sectors, such as at-sea whiting and tribal groundfish fisheries.

The TAC for Pacific whiting is annually set outside of this harvest specifications process. The 2015 Pacific whiting TAC and allocations are used to derive an estimate of catch and resulting revenue for the whiting sectors. For the at-sea sectors, revenue is assumed to be the same across all alternatives.

Compared to Alternative 1, Alternative 2 shows an overall increase in shoreside ex-vessel revenue from $19.8 million to a total of $108.8 million. Almost all of this change occurs in the shoreside IFQ sector. Alternative 2 combines the preferred ACLs with preferred management measures.

Table 4-11. Change in groundfish ex-vessel revenues from Alternative 1 by shoreside harvest sector under the action alternatives (percent).

	Alternative 1	**Alternative 2***
	2017-2018	**2017-2018**
Shoreside Sectors:		
Whiting	*13.3*	**-0.0%**
Non-whiting Trawl+Non-trawl IFQ	*40.0*	**+49.3%**
Limited Entry Fixed Gear	*16.3*	**+2.9%**
Nearshore Open Access	*4.7*	**-0.9%**
Non-nearshore Open Access	*4.5*	**-8.9%**
Incidental Open Access	*0.2*	**+0.0%**
Tribal (incl. whiting)	*9.9*	**+0.1%**
Shoreside sectors' Totals	***88.9***	**+22.3%**
At-sea Sectors:		
Non Tribal Whiting	*25.9*	**+0.0%**
Tribal Whiting	*5.1*	**+0.0%**
At-sea sectors' Totals	***31.0***	**+0.0%**
TOTAL Groundfish Revenue	***119.9***	**+16.5%**

*Alternative 2 combines preferred ACLs with preferred management measures.

As described in Section 4.2.2.5, the Council adopted higher ACLs for canary rockfish, darkblotched rockfish, and POP than what was previously analyzed under Alternative 2 from the Council's April meeting. Additionally, slight increases in the off-the-top deductions to the ACL were made for chilipepper and bocaccio, which resulted in slightly different trawl and non-trawl allocations for these species. The changes are not part of this EA, and they are not expected to have a substantial effect on the estimates of ex-vessel revenue, net revenue, personal income, and employment summarized in this section. Therefore, the Alternative 2 analysis was not re-run. A qualitative description of the expected socioeconomic benefits of the final ACLs, compared to the previous ACLs under Alternative 2, is provided below.

Increasing the darkblotched rockfish and POP ACLs under Alternative 2 would likely primarily benefit the trawl fisheries, since catch in the non-trawl sectors has been well below the allocation (WCGOP Groundfish Mortality Reports). For the at-sea sectors, the higher allocations would increase the likelihood that the sectors would attain their respective whiting allocations. For the shorebased IFQ program, the increased POP allocation would likely facilitate the mid-water rockfish trawl strategy for yellowtail rockfish and widow rockfish. The increases for both POP and darkblotched rockfish would likely provide increased access to whiting and other slope species.

The buffer concept (discussed in Section 4.2.2.5) under Alternative 2 could help further reduce bycatch constraints in the at-sea whiting sectors since the sector could receive more than its original Amendment 21 allocations if an unforeseen catch event occurred, and fish were reallocated inseason. The buffer could also provide relief to IFQ vessel owners who exceed their annual vessel limits since releasing it would increase the annual vessel limits. The higher canary rockfish ACLs, combined with the buffer, would likely benefit all sectors if an unforeseen catch event occurred. Therefore, no significant impacts would be likely from Alternative 2.

4.1.2.5 Pacific Whiting

Setting the Pacific whiting TACs in 2017 and 2018 is not part of the proposed action. This is because the whiting TAC is set annually under an international agreement with Canada on Pacific hake/whiting. However, a range of whiting TACs is analyzed to understand the potential implications of the allocation. The nontribal commercial share of whiting (U.S. ACL reduced by set asides for open-access incidental catch, research, EFPs, and tribal allocations) is allocated to limited entry whiting trawl sectors as follows: 42 percent for the Pacific whiting shorebased IFQ sector, 24 percent for the at-sea MS sector, and 34 percent for the at-sea C/P sector. A range of reductions to the U.S. ACL is analyzed in the Council's analytical document (Agenda Item G.4, Attachment 2 June 2016).

Since 2011, long-term allocations of non-whiting groundfish have been established between the trawl and nontrawl sectors of the groundfish fishery. Trawl allocations are further split between the at-sea trawl and shoreside trawl sectors. Deductions from most groundfish ACLs, called off-the-top deductions, are made to account for several sources of mortality, including mortality in the Pacific Coast treaty Indian tribal fisheries. During each biennial harvest, specifications and management measure cycle tribal representatives inform the Council of their expected mortality of groundfish. For non-tribal trawl fisheries, the shoreside fishery, whiting, and non-whiting fisheries are managed as one sector under the shorebased IFQ program. Because the catch of non-whiting groundfish must be maintained within the individual's quota pounds, the bycatch implications of the trawl IFQ fishery, including vessels targeting Pacific whiting, are discussed relative to individual species and complexes. Overfished species most commonly encountered in the Pacific whiting fishery are canary rockfish, darkblotched rockfish, and POP. Non-overfished groundfish species commonly caught in the at-sea sectors and the tribal fishery are shown in Table 4-12. Yellowtail rockfish, spiny dogfish, arrowtooth flounder, and minor slope rockfish had the highest average incidental catch between 2007 and 2011. Groundfish regulations specify set asides for the non-tribal, at-sea sectors.

Table 4-12. Non-whiting groundfish catch (mt) in the Tribal and At-sea sectors of the Pacific whiting fishery, 2011 to 2015 (in mt).

Year	**2011**	**2012**	**2013**	**2014**	**2015**
Pacific Whiting	121,730	93,743	130,399	165,302	96,144
Arrowtooth	45.21	4.64	14.53	10.72	66.94
Dover sole	1.17	0.32	1.10	0.92	0.82
English sole	0.02	0.01	0.01	0.01	0.00
Lingcod	0.16	0.18	1.51	0.89	0.85
Longspine thornyhead	0.40	0.00	0.00	0.00	0.02
Minor shelf rockfish	0.68	0.98	1.39	0.26	0.79
Minor slope rockfish [a/]	90.74	75.17	44.03	25.39	36.41
Other flatfish	5.87	2.89	12.06	8.18	6.21
Pacific cod	0.01	0.02	0.03	0.00	0.00
Petrale sole	0.00	0.00	0.00	0.00	0.00
Shortbelly rockfish		0.30	0.73	0.01	0.03
Shortspine thornyhead	13.40	1.74	21.73	20.44	10.51
Spiny dogfish	725.53	177.93	97.84	59.70	97.38
Thornyhead, unid.	0.13		0.50	2.55	0.00
Yellowtail rockfish	81.36	43.15	268.54	44.54	86.82
Unidentified rockfish	0.03	0.00		0.00	0.00

Projected mortalities for overfished species assume that the full at-sea allocation for overfished species is taken and that projected catch is within the ACLs established for rebuilding. Non-overfished species set asides are evaluated on a biennial basis, and the need to modify values to maintain the total catch within the trawl allocations is considered to prevent exceeding the trawl allocation. Management of the at-sea fleet through allocations and set asides reduces the risk of overfishing non-whiting groundfish species regardless of the whiting allocations.

Spiny dogfish is a common bycatch species in the Pacific whiting fisheries. A Pacific whiting TAC that is higher than the Alternative 1 TAC would likely result in increased bycatch of spiny dogfish. Without IFQ for the shoreside fishery, or set asides for the at-sea fisheries, total catch mortality would have to be monitored closely inseason to reduce the risk of exceeding the ACL. The Pacific whiting fisheries are well monitored, reducing error in estimates of true total catch mortality and the risk of exceeding a harvest specification.

An area of concern is the component stocks within the Minor Slope Rockfish complex, as catch largely consists of rougheye/blackspotted rockfish. Impacts on these species relative to the whiting fishery are specifically discussed in the Council's analytical document, which discusses all of the allocations for the

2017-2018 biennium. The set aside for arrowtooth flounder would increase by 25 mt, from 45 to 70 mt. The at-sea sectors of the Pacific whiting fishery may be closed if a total catch limit (allocation or HG) of an overfished species has been reached before the sector's whiting allocation is reached. Total catch limits in the primary Pacific whiting fishery may be established or adjusted as routine management measures. Therefore, the impacts of a range of Pacific whiting TACs on overfished species would be limited by the overfished species allocations. The Pacific whiting fisheries are well monitored, reducing the error in estimates of true total catch mortality and the risk of exceeding a harvest specification.

The Council's Final Preferred ACLs were higher than its preliminary ACLs presented in April, which resulted in increased allocations for darkblotched and POP (Agenda Item G.4, Attachment 3, June 2016 and Agenda Item G.4, Attachment 2, June 2016; Tables 4-105). For the C/P sector, the final preferred structure under Alternative 2 would result in annual allocations that would be 2.5 mt higher for POP and an average of 3.1 mt higher for darkblotched rockfish. For the MS sector, the final preferred structure under Alternative 2 would result in annual allocations that would be 1.8 mt higher for POP and an average of 2.2 mt higher for darkblotched rockfish.

The bootstrap modeling for the at-sea sectors was done on the initial ACLs allocations proposed for darkblotched rockfish and POP under Alternative 2. The small increase in allocations would likely slightly increase the probability that the sectors would attain their whiting allocations without exceeding the bycatch species allocations.

Table 4-13 shows the allocations considered through the 2017-2018 biennial specifications and management measures.

The at-sea sectors of the Pacific whiting fishery may be closed if a total catch limit (allocation or HG) of an overfished species has been reached before the sector's whiting allocation is reached. Total catch limits in the primary Pacific whiting fishery may be established or adjusted as routine management measures. Therefore, the impacts of a range of Pacific whiting TACs on overfished species would be limited by the overfished species allocations. The Pacific whiting fisheries are well monitored, reducing the error in estimates of true total catch mortality and the risk of exceeding a harvest specification.

Table 4-13. At-sea Whiting Fishery Annual Set-asides (Alternative 2)

Species or Species Complex	**Area**	**2017 Set Aside (mt)**	**2018 and Beyond Set Aside (mt)**
BOCACCIO	S. of 40°10 N. lat.	NA	NA
COWCOD	S. of 40°10 N. lat.	NA	NA
DARKBLOTCHED ROCKFISH a/	Coastwide	Allocation	Allocation
PACIFIC OCEAN PERCH a/	N. of 40°10 N. lat.	Allocation	Allocation
YELLOWEYE ROCKFISH	Coastwide	0	0
Arrowtooth flounder	Coastwide	70	70
Canary rockfish a/	Coastwide	Allocation	Allocation
Chilipepper	S. of 40°10 N. lat.	NA	NA
Dover sole	Coastwide	5	5
English sole	Coastwide	5	5
Lingcod	N. of 40°10 N. lat.	15	15
Lingcod	S. of 40°10 N. lat.	NA	NA
Longnose skate	Coastwide	5	5
Longspine thornyhead	N. of 34°27 N. lat.	5	5
Longspine thornyhead	S. of 34°27 N. lat.	NA	NA
Minor Nearshore Rockfish	N. of 40°10 N. lat.	NA	NA
Minor Nearshore Rockfish	S. of 40°10 N. lat.	NA	NA
Minor Shelf Rockfish	N. of 40°10 N. lat.	35	35
Minor Shelf Rockfish	S. of 40°10 N. lat.	NA	NA
Minor Slope Rockfish	N. of 40°10 N. lat.	100	100
Minor Slope Rockfish	S. of 40°10 N. lat.	NA	NA
Other Fish	Coastwide	NA	NA
Other Flatfish	Coastwide	20	20
Pacific cod	Coastwide	5	5
Pacific Halibut b/	Coastwide	10	10
Pacific Whiting	Coastwide	Allocation	Allocation
Petrale sole	Coastwide	5	5
Sablefish	N. of 36° N. lat.	50	50
Sablefish	S. of 36° N. lat.	NA	NA
Shortspine thornyhead	N. of 34°27 N. lat.	20	20
Shortspine thornyhead	S. of 34°27 N. lat.	NA	NA
Starry flounder	Coastwide	5	5
Widow Rockfish a/	Coastwide	Allocation	Allocation
Yellowtail rockfish	N. of 40°10 N. lat.	300	300

The Council's Final Preferred ACLs were higher than its preliminary ACLs presented in April, which resulted in increased allocations for darkblotched and POP (Agenda Item G.4, Attachment 3, June 2016 and Agenda Item G.4, Attachment 2, June 2016; Tables 4-105). For the C/P sector, the final preferred structure under Alternative 2 would result in annual allocations that would be 2.5 mt higher for POP and an average of 3.1 mt higher for darkblotched rockfish. For the MS sector, the final preferred structure under Alternative 2 would result in annual allocations that would be 1.8 mt higher for POP and an average of 2.2 mt higher for darkblotched rockfish.

The bootstrap modeling for the at-sea sectors was done on the initial ACLs allocations proposed for darkblotched rockfish and POP under Alternative 2. The small increase in allocations would likely slightly increase the probability that the sectors would attain their whiting allocations without exceeding the bycatch species allocations.

Table 4-14 shows a range of possible whiting sector allocations derived from an historical analysis of Pacific whiting harvest limits (optimum yield [OY], U.S. TAC) from 2007 to 2016. Shoreside-sector Pacific whiting allocations under the 2016 update would be 85,697 mt, the original shoreside sector allocation in 2013.

Allocations under the alternative TACs for the whiting MS sector range from 12,017 mt to 87,131 mt. The highest and lowest final allocations for the sector were 58,087 mt in 2008 and 24,034 mt in 2009, respectively. The allocation assumed for the MS sector under the alternatives for 2015-2016 would be 48,969 mt, the original MS sector allocation in 2013. Allocations under the alternative TACs for the C/P sector would range from 17,688 mt to 173,684 mt. The highest and lowest final allocations for the sector were 115,789 mt recorded in 2008 and 35,376 mt in 2009, respectively. By comparison, the allocation for the C/P sector assumed under the alternatives for 2015-2016 would be 69,373 mt, the original C/P sector allocation in 2013.

Table 4-14 Range of potential Pacific whiting allocations by sector based on actual annual 2005 to 2013 final sector allocations compared with values projected under the alternatives (mt).*

ACL Scenario	Year	Shoreside Sector	MS Sector	C/P Sector	Tribal Sector	Total Implied Combined Non-Tribal Commercial Whiting Sectors' Harvest Guideline
		mt	mt	mt	mt	mt
Lowest minus 50%	--	20,369	12,017	17,688	25,000	50,074
Lowest	2009	40,738	24,034	35,376	50,000	100,148
Highest	2016	126,727	72,415	102,589	66,908	301,731
Highest plus 50%	--	190,091	108,623	153,884	100,362	452,597
2015 (Assumed under the Alternatives)	2015	126,727	64,004	112,007	56,888	302,738

*Based on initial sector allocations each year during the period (i.e., before all in-season reallocations).

4.2 Impacts of the New Management Measure Alternatives

New management measures may be adopted during the biennial specifications process. This section describes the impacts of the new management measure alternatives on physical resources, including EFH, biological resources, ESA-listed and protected species, and socioeconomic resources. They may include measures for which impacts have not yet been analyzed and/or have not been previously implemented in regulation. The Council is considering several new management measures for implementation in 2017-2018. A detailed analysis of new management measures is provided in Appendix B.

The new management measures described in this section were not derived from a large range for each measure. Therefore, there is an Alternative 1 for each measure below where the measure would not be implemented and an Alternative 2. This section also references the 2015 EIS locations for impacts of Alternative 1 (Final Preferred Alternative in the 2015 EIS).

4.2.1 Physical Resources, including EFH

The sections below provide information on the physical resources. The effects are presented for each alternative.

4.2.1.1 Alternative 1

There is no new information to suggest that the impacts of Alternative 1 have changed since they were analyzed in the 2015 EIS. See Chapter 4.4 of the 2015 EIS for the effects of the fishery on EFH.

4.2.1.2 Alternative 2 (Preferred Alternative)

The impacts of Alternative 2 are discussed below. They include discussions of multiple species off the coasts of California and Oregon.

4.2.1.2.1 Classification of Big Skate in the Fishery Management Plan

Alternative 2 is not expected to have any adverse effects on EFH compared to Alternative 1. Fishing for big skate is already occurring, and distribution of fishing is not expected to shift in any manner that would cause significant impacts on physical resources including EFH. Further, the shorebased IFQ fishery would continue to be managed with closed areas and with designated EFH. Therefore, there would be no significant impacts on the physical environment under this measure.

4.2.1.2.2 Oregon Recreational Flatfish Fishery

Alternative 2 is not expected to change fishing activity to affect EFH adversely, and it would be unlikely to have any impacts in addition to those from Alternative 1 for the Oregon recreational fishery as described in the 2015 EIS. Targeting of these species in this area is currently allowed part of the year. Additionally, most species of flatfish inhabit soft sandy or muddy bottom, which is currently not designated as EFH for groundfish species. The anticipated gear used would be lightweight recreational fishing gear, with no heavy weights or lines impacting the substrate. Therefore, there would be no significant impacts on the physical environment under this measure.

4.2.1.2.3 New Inseason Process for California Recreational and Commercial Fisheries

Compared to Alternative 1, Alternative 2 is would be unlikely to change fishing activity in a manner that would adversely affect EFH, since it is solely proposed to reduce catch and not to increase take opportunities. The recreational and commercial fisheries would continue to operate in the same manner as described under Alternative 1, with various closed areas, which would protect habitat. Therefore, there would be no significant impacts on the physical environment under this measure.

4.2.1.2.4 Petrale Sole and Starry Flounder Season in California Recreational Fishery

Compared to Alternative 1, Alternative 2 would be unlikely to change fishing activity in a manner that would adversely affect EFH, as anglers are currently fishing in locations where petrale sole and starry flounder are encountered. Additionally, petrale sole and starry flounder are found primarily over soft sandy or muddy bottom habitats and in areas that are not designated as groundfish EFH. Further, the recreational fishery uses gear types known to have minimal to negligible habitat impacts. Therefore, there would be no significant impacts on the physical environment under this measure.

4.2.1.2.5 Deduction from the Annual Catch Limit to Account for Unforeseen Catch Events (the Buffer)

Compared to Alternative 1, Alternative 2 would be unlikely to change fishing activity in a manner that would adversely affect EFH, because the buffer amounts are held in reserve to cover unforeseen catch

events not allocated to fisheries in a manner that would change their fishing practices. Therefore, no change in fishing behavior would be likely, because it would be highly inefficient and uncertain for any sector to fish out an allocation in the hopes that the buffer would then be allocated to them inseason.

4.2.2 Biological Resources

The sections below address the effects of Alternative 1 and Alternative 2. Under Alternative 1, the impacts on the biological environment have not significantly changed since the 2015 EIS. See Chapter 4.2 of the 2015 EIS for the effects of the fishery on groundfish stocks and Chapter 4.1 for the effects on biological resources.

4.2.2.1 Alternative 1

There is no new information to suggest that the impacts of Alternative 1 have changed since analyzed in the 2015 EIS. See section 4.8 of the 2015 EIS for the effects of the fishery on biological resources.

4.2.2.2 Alternative 2 (Preferred Alternative)

The effects of Alternative 2 are discussed below. Various species are addressed.

4.2.2.2.1 Classification of Big Skate in the Fishery Management Plan

Section 4.1.1.2 above describes Alternative 1 for big skate. The changes for big skate come in two parts: the first is the harvest specification (as described above), and the second is the change in the FMP that would redesignate the stock from an EC species to an "in the fishery" stock by listing it in Table 3-1 of the FMP, which is discussed in this section. Table 3-1 of the FMP lists the species managed in the fishery. Harvest under Alternative 2 might reduce catches of big skate only slightly compared to Alternative 1 and past years (specifically 2014), as catches at that time were unrestricted. Under Alternative 1, big skate would not have a species-specific harvest specification, and catch would not be restricted. Alternative 2 would not likely affect catch of nongroundfish species, compared to Alternative 1, as fishing for big skate already occurs, and no significant change in distribution is anticipated. The harvest specifications for this stock use the default HCR for healthy stocks. Therefore, no significant impacts to the biological environment would be likely from this measure.

4.2.2.2.2 Oregon Recreational Flatfish Fishery

Under Alternative 1, no additional flatfish species retention would be allowed in the Oregon recreational fishery. Under Alternative 2, raising retention allowances for flatfish species could increase the catch of some flatfish species, likely in the Other Flatfish complex (which includes Pacific sanddab, butter sole, and sand sole, English sole, and petrale sole). As shown in Table 4-15, annual mortality of the Other Flatfish complex is approximately 20 percent of the ACL, and English sole is approximately 5 percent of its ACL. The Other Flatfish complex annually leaves approximately 3,900 mt unharvested, and English sole leaves more than 5,000 mt unharvested. Increased mortality from Alternative 2, compared to

Alternative 1, would be a small percentage of what is currently unharvested; therefore, there would be little to no chance of exceeding the ACL, making the risk of overfishing under Alternative 2 nominal.

Table 4-15. Annual limits, mortality, and percent attainment of limits for the Other Flatfish complex, English sole, and petrale sole, 2011 to 2014.

Year	Species	Other Flatfish Complex [a]	English sole	Petrale sole
2014	ACL (mt)	4,884.0	5,646.0	2,652.0
	Total mortality (mt)	1,106.0	306.0	2,439.0
	Difference (mt)	3,778.0	5,340.0	213.0
	% ACL attainment	22.6%	5.4%	92.0%
	Non-trawl allocation (mt)			35
	non-trawl mortality (mt)			1.59
	Difference (mt)			33.41
	% non-trawl attainment			4.5%
2013	ACL (mt)	4,884.0	6,815.0	2,592.0
	Total mortality (mt)	1,080.0	357.0	2,265.0
	Difference (mt)	3,804.0	6,458.0	327.0
	% ACL attainment	22.1%	5.2%	87.4%
	Non-trawl allocation (mt)			35
	non-trawl mortality (mt)			3.2
	Difference (mt)			31.8
	% non-trawl attainment			9.0%
2012	ACL (mt)	4,884.0	10,150.0	1,160.0
	Total mortality (mt)	897.0	224.0	1,111.0
	Difference (mt)	3,987.0	9,926.0	49.0
	% ACL attainment	18.4%	2.2%	95.8%
	Non-trawl allocation (mt)			35
	non-trawl mortality (mt)			1.72
	Difference (mt)			33.28
	% non-trawl attainment			4.9%
2011	ACL (mt)	4,884.0	19,761.0	976.0
	Total mortality (mt)	921.0	205.0	953.0
	Difference (mt)	3,963.0	19,556.0	23.0
	% ACL attainment	18.9%	1.0%	97.6%
	Non-trawl allocation (mt)			35
	non-trawl mortality (mt)			1.29
	Difference (mt)			33.71
	% non-trawl attainment			3.7%

[a] includes Pacific sanddab, butter sole, and sand sole, among others.

Petrale sole annual attainment is approximately 90 percent of the ACL. Most of the mortality comes from the trawl fisheries. The non-trawl fisheries have been allocated 35 mt in recent years. The annual mortality for all non-trawl sectors has been approximately 2 mt, just over 5 percent of the non-trawl allocation. While there is not the magnitude of unharvested allocation present for the Other Flatfish complex, there does appear to be an opportunity to remove restrictions on flatfish retention under Alternative 2 without exceeding either the non-trawl allocation or the ACL. The risk of overfishing from this management measure alone would be minimal.

Impacts from the Oregon recreational fishery are described in Chapter 4.7 of the 2015 EIS. Alternative 2 would be unlikely to affect catch of nongroundfish species. The area/habitat that would likely be fished, as well as the likely gear used to target these species (Figure 4-7), would limit the impacts on other nongroundfish species. Most species of flatfish live on soft sandy, muddy, or gravel substrates where there is a limited number of nongroundfish species. Additionally, the anticipated gear (small hooks, fished benthically) is intended to attract species with small mouths that feed benthically, thereby avoiding most nongroundfish species. Activities under this management measure would be monitored via the current Oregon Ocean Recreational Boat Sampling Program, which provides monthly estimates of catch. Catches would be tracked along with other groundfish species. Therefore, there would be no significant impacts on the biological environment under this measure.

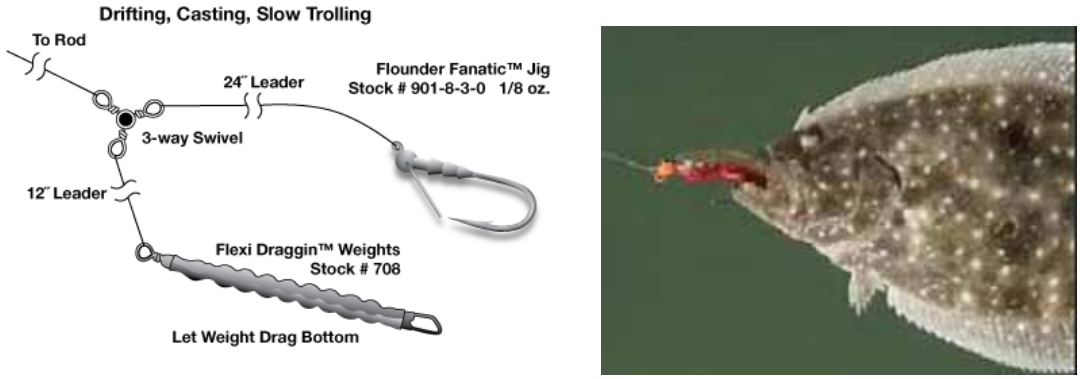


Figure 4-7. Terminal tackle that is often used to target flatfish species. The gear is designed to drag small hooks on a sandy bottom, away from rocks.

4.2.2.2.3 New Inseason Process for California Recreational and Commercial Fisheries

Under Alternative 1, inseason changes to commercial and recreational fisheries would only occur at a Council meeting, and no changes to Federal management measures would be allowed outside of a Council meeting. Alternative 2 would not likely have substantial biological impacts compared to

Alternative 1, because this measure would only be used to restrict catch of fisheries that occur in the waters off California if the harvest specifications for black rockfish, canary rockfish, or yelloweye rockfish were attained or were projected to be attained before the start of the next Council meeting. There may be minor positive impacts from reducing catch for any of the species. However, because these stocks have generally been caught within their harvest limits, this measure would likely have only minor positive impacts, should it be used at all. This measure also would not change the Council's ability to make inseason adjustments at Council meetings.

Allowing for inseason actions outside of Council meetings based on attainment or projected attainment of harvest limits for yelloweye rockfish and canary rockfish to facilitate timely response to management needs, in and of itself, would not change catches, compared to Alternative 1. If a harvest limit were attained or projected to be attained, then this measure would reduce catches of those stocks to remain within allowable limits. This management measure would not likely affect catch of non-groundfish species since it is solely proposed to reduce catch and not increase opportunities. Therefore, there would be no significant impacts on the biological environment under this measure.

4.2.2.2.4 Petrale Sole and Starry Flounder Season in California Recreational Fishery

Petrale Sole

Under Alternative 1, retention of petrale sole would be prohibited in the California recreational fishery during the recreational season and depth closures. Any petrale sole or starry flounder encountered during the closed months or outside of the allowable depths must be discarded. This has led to instances where anglers have to discard these species while targeting other species that have different seasons and/or allowable depth than groundfish (e.g., Pacific halibut), or that are open year-round without depth constraint (e.g., Pacific sanddab).

Under Alternative 2, mortality of petrale sole would likely increase slightly, compared to Alternative 1, but it would probably remain within in allowable limits for the non-trawl sector. Therefore, there would be little risk of overfishing based on expected mortality under Alternative 2.

Petrale sole is currently managed coastwide as a single stock. Under Amendment 21, petrale sole was allocated between trawl and non-trawl sectors. The non-trawl allocation has not been divided among the commercial non-trawl and recreational sectors. Petrale sole mortality in the commercial fixed gear and recreational sectors has been relatively minimal in recent years (Table 4-16).

Table 4-16. Mortality of petrale sole in the non-trawl sectors from 2011 to 2014 and percent attainment of the 35-mt allocation.

Year	California Recreational (mt)	Other Non-Trawl (mt)[a]	Total non-Trawl (mt)[a]	% of Non-Trawl Allocation
2011	0.52	0.77	1.29	4%
2012	0.73	0.99	1.72	5%
2013	1.11	2.24	3.35	10%
2014	0.86	0.73	1.59	5%

Source: WCGOP Total Mortality Report.

[a] Includes non-trawl commercial, as well as Oregon and Washington recreational mortality.

Average recreational mortality from 2011 to 2014, when petrale sole retention was prohibited under Alternative 1, was 0.82 mt and 0.24 mt in California and Oregon fisheries, respectively; no mortality was reported in Washington's recreational fishery. In the commercial non-trawl sector, average coastwide mortality was 0.89 mt during that same period. Combined, the average mortality of petrale sole in the non-trawl sector was 2.0 mt, less than 10 percent of the non-trawl allocation (35 mt).

Removing petrale sole from the California recreational groundfish season and depth limit restrictions under Alternative 2 would most likely lead to anglers retaining the petrale sole they would otherwise discard, while targeting fish species found deeper than the current depth restrictions. Given that petrale sole are encountered in the recreational fishery, however, especially during the closed months, any increase would likely be minimal compared to Alternative 1. For example, Recreational Fisheries Information Network data indicate that 426 petrale sole were encountered in 2014 during months that were outside the groundfish season. If it were assumed that all fish encountered outside of the groundfish season, which would be open under Alternative 2, were retained, and the mean weight of observed petrale sole in 2014 was 0.83 kg, the resulting additional/increase in mortality under Alternative 2 would be approximately 0.35 mt.

While this value serves as a proxy to inform additional mortality expected to accrue during closed months based on current fishing behavior, removing the season and depth restrictions for petrale sole might further increase mortality, as angler behavior is uncertain. While it is likely that some increased effort may be realized under this management measure, it cannot be reasonably quantified. However, even if mortality in the California recreational fishery were to increase by 5 times the highest mortality in recent years (1.1 mt in 2013), and that value were combined with the highest mortality in the remaining non-trawl sectors (2.1 mt in 2013), the total (7.6 mt) could still be accommodated by the non-trawl allocation

(144.8 mt and 138.6 mt in 2017 and 2018, respectively). Therefore, there would be little risk of exceeding the non-trawl allocation, or an ACL, under Alternative 2.

If inseason tracking indicated that mortality was tracking higher than expected, action could be taken to reduce or eliminate catches. However, recreational mortality was relatively minimal, even when the fishery was not restricted by season length and depth. Prior to 2000, the California recreational fishery was not restricted by depth or season length. During this period, the highest estimated mortality was 0.6 mt (1996), with an average estimated mortality of 0.2 mt per year.

As shown in Table 4-17, mortality of petrale sole in the non-trawl sector has not exceeded 10 percent of the non-trawl allocation. Considering the substantial increases in the non-trawl allocation for 2017 and 2018 of 114.8 mt and 138.6 mt, respectively, from the 35-mt non-trawl allocation in 2016, there is little risk in overfishing from this management measure alone. Further, because petrale sole inhabit soft sandy or muddy bottom, interactions with overfished species are expected to be negligible. As a result, there is an opportunity to allow for increased impacts, which would further use what is currently an underutilized non-trawl allocation, with minimal risk of exceeding the non-trawl allocation, let alone the ACL.

Starry Flounder

Under Alternative 1, starry flounder retention would be prohibited in the California recreational fishery. Under Alternative 2, starry flounder retention would be allowed, along with petrale sole. Starry flounder is currently managed coastwide as a single stock. Under Amendment 21, the stock was formally allocated between trawl and non-trawl sectors. The non-trawl allocation has not been formally divided among the commercial non-trawl and recreational sectors. However, starry flounder mortality in the commercial fixed gear and recreational sectors has been relatively minimal in recent years (Table 4-17). Since, 2011, attainment of the starry flounder non-trawl allocation has not exceeded 1 percent.

Table 4-17. Mortality of starry flounder in the non-trawl sectors from 2010 to 2014; non-trawl allocation and percent attainment of the non-trawl allocation, 2011 to 2014.

Year	California Recreational (mt)	Other Non-trawl (mt)	Total non-trawl (mt)[a]	Non-trawl allocation (percent attainment)
2011	1.24	3.10	4.34	673.0 (0.6%)
2012	0.94	3.13	4.07	677.0 (0.6%)
2013	0.93	0.11	1.04	763.5 (.0.1%)
2014	1.70	2.99	4.69	760.5 (0.6%)

Source: WCGOP Total Mortality Report.

[a] Includes non-trawl commercial, as well as Oregon and Washington recreational mortality.

Under Alternative 2, mortality of starry flounder would likely increase compared to Alternative 1; however, the increase would likely be minimal compared to the non-trawl allocation. Starry flounder are

primarily encountered in the Central and San Francisco Management Areas, which, combined, account for approximately 97 percent of total encounters occurring in California in recent years (2014 and 2015). As a result, it is likely that the number of anglers would be somewhat limited to those currently fishing in those management areas. Given that mortality of starry flounder in the recreational sector is relatively minimal, and mortality in the non-trawl sector has been well below the allocation, this management measure would be unlikely to cause mortality to exceed non-trawl allocation, let alone an ACL, particularly considering the large residual between recent mortality and the non-trawl allocation of 635.9 mt for 2017 and 2018. Therefore, due to the low attainment compared to the allocation, there would be no significant impacts on petrale sole or starry flounder under this measure. Further, because any increase in catch would likely be minimal, there would be no expected impacts on the Other Fish complex, which is also caught with these species.

4.2.2.2.5 Deduction from the Annual Catch Limit to Account for Unforeseen Catch Events (the Buffer)

The buffer approach is similar to the existing process that is used when research, EFP, or incidental open access mortality is lower than the pre-season projections, and a sector has realized a need to access the residual yield (see Section 4.1.4.1 of the Council's analytical document [Council 2016]). Under the buffer approach, all sectors would receive lower allocations than if the entire ACL were allocated (Table 4-18). The buffer approach would not likely result in changes in fishing behavior, compared to Alternative 1, because the sectors would continue to be managed within the existing management system, which is designed to increase access to target species while minimizing bycatch interactions (e.g., individual accountability and co-op management in the trawl sectors). Furthermore, there is no guarantee that the buffer would be released, and there is limited access to it since the recommendation to release a buffer could only occur at a Council meeting through routine inseason action with implementation occurring several weeks later. Therefore, it would be impractical and inefficient to design fishing operations based on potential access to the buffer.

Table 4-18 Canary rockfish, POP, and darkblotched rockfish allocations with and without the buffers.

	Canary Rockfish		POP		Darkblotched Rockfish	
Allocation type	**Buffer**	**No Buffer**	**Buffer**	**No Buffer**	**Buffer**	**No Buffer**
ACL	1,714.0	1,714.0	281.0	281.0	641.0	641.0
"Off-the-top" set asides	59.4	59.4	24.4	24.4	27.3	27.3
Buffer	188.0	0.0	25.0	0.0	50.0	0.0
Fishery HG	1,466.6	1,654.6	231.6	256.6	563.7	613.7
Non-trawl	406.5	406.5	11.6	12.8	28.2	30.7
Trawl	1,060.1	1,248.1	220.0	243.8	535.5	583.0
--SB Trawl	1,014.1	1,202.1	198.3	219.7	507.6	552.6
--At-sea whiting MS	30.0	30.0	9.0	9.9	11.6	12.6
--At-sea whiting C/P	16.0	16.0	12.7	14.1	16.4	17.8
Non-trawl	406.5	406.5	11.6	12.8	28.2	30.7
--Non-nearshore HG	46.5	46.5	-----	-----	-----	-----
--Nearshore HG	100	100	-----	-----	-----	-----
--WA Rec HG	50	50	-----	-----	-----	-----
--OR Rec HG	75	75	-----	-----	-----	-----
--CA Rec HG	135	135	-----	-----	-----	-----

For darkblotched rockfish and POP, the buffer would not be anticipated to extend rebuilding, because the amount of the buffer would be taken under the ACL, and the current inseason management tools would allow the Council and NMFS to take action to reduce the catch of any species exceeding an ACL. If a fishery HG and the buffer were exceeded, the current inseason management tools would still allow the Council and NMFS to prevent overfishing and to reduce any potential impacts on rebuilding. Therefore, there would be no significant impacts on the biological environment under Alternative 2.

4.2.3 ESA-listed and Protected Species

4.2.3.1 The sections below provide information on the ESA-listed and protected species. The effects are presented for each alternative.Alternative 1 (No Action Alternative)

As stated above in section 4.1.1.3, NMFS has reinitiated ESA Section 7 consultation on the ongoing operation of the PCGFMP on salmon, eulachon, short-tailed albatross. The NMFS BiOp (NMFS 2012) established the Council's ESA Workgroup whose task is to evaluate take of listed species (except salmon) and make management measure or initiation recommendations to the Council. In its 2015 report, the ESA Workgroup made no management measure recommendations because the current management measures were not concluded to be the cause of the ITS exceedances, and changes to management measures were not determined to be needed at this time to address the ITS exceedances. The ESA Workgroup indicated that the likely causes of the eulachon and short-tailed albatross ITS exceedances were increases in the

eulachon and short-tailed albatross populations, rather than changes in the fishery that could be addressed through management changes. Therefore, no significant impacts to listed species would be anticipated from Alternative 1.

4.2.3.2 Alternative 2 (Preferred Alternative)

The effects of Alternative 2 are discussed in the sections below.

4.2.3.2.1 Classification of Big Skate in the Fishery Management Plan

Under Alternative 1, big skate would be designated as an EC species. The shorebased IFQ fishery, which represents the majority of the big skate landings, would operate in the same manner under Alternative 2. There is no information to conclude that protected species takes would differ substantially from Alternative 1. Fishing for big skate is already occurring, and distribution would not likely change. Currently, there are few impacts on listed species from the shorebased IFQ fishery. Furthermore, most fishing occurs within the IFQ fleet that is under 100 percent observer coverage, which would provide any evidence of increases in encounters with ESA-listed species or non-listed mammals or seabirds. Therefore, there would be no significant impacts on ESA-listed or protected species under this measure.

4.2.3.2.2 Oregon Recreational Flatfish Fishery

Under Alternative 1, the Oregon recreational fishery would not likely affect listed species because encounters between listed species and the Oregon recreation fishery are minimal. Alternative 2 would likely have minimal effects on ESA-listed species and/or non-listed marine mammals and seabirds. There is no information to conclude that protected species takes would differ substantially from effects under Alternative 1. The current Oregon recreational groundfish fishery has no reported take of marine mammals or seabirds, and this would be unlikely to change under Alternative 2 for most listed species.

There may be some encounters with ESA-listed salmon species; however, the magnitude of such encounters would likely be similar to the encounters under Alternative 1. The current Oregon State regulations prohibit retention of salmon species from groundfish gear, and barbless hooks are required, which increase release survival of salmon. Most flatfish species have small mouths; therefore, the gear that anglers likely would use to target flatfish species (Figure 4-8) would have small hooks, which should further limit the potential for impacting ESA-listed species compared to Alternative 1. Therefore, there would be no significant impacts to ESA-listed or protected species under this measure other than those previously analyzed in an EIS.

4.2.3.2.3 New Inseason Process for California Recreational and Commercial Fisheries

There is no information to conclude that protected species take under Alternative 1 would differ substantially from the average level of takes during the baseline period used in the 2012 NMFS and USFWS BiOps. A substantial increase in the level of take would trigger action under applicable law to mitigate any increased take, if necessary. Alternative 2 would be unlikely to change encounter rates with marine mammals, seabirds, or ESA-listed species from that of the current fishery. Currently, impacts on marine mammals, seabirds, and ESA-listed species are minimal. There have been no reported impacts on marine mammals, seabirds, and ESA-listed species in the recreational groundfish fishery, while impacts in the commercial fishery are observed and documented. There is no information to conclude that protected species take would differ substantially from Alternative 1 under Alternative 2. Therefore, there would be no impacts on ESA-listed or Protected species under this management measure.

4.2.3.2.4 Petrale Sole and Starry Flounder Season in California Recreational Fishery

There is no information to conclude that protected species take under Alternative 1 would differ substantially from the average level of takes during the baseline period used in the 2012 NMFS and USFWS BiOps. This management measure would not likely impact ESA-listed species and/or non-listed marine mammals and seabirds. The current California recreational groundfish fishery has no reported take of marine mammals or seabirds, nor are any expected by allowing discarded fish to be retained. There is no information to conclude that protected species takes under Alternative 2 would differ substantially from Alternative 1. Therefore, there would be no impacts on ESA-listed or protected species under this management measure.

4.2.3.2.5 Deduction from the Annual Catch Limit to Account for Unforeseen Catch Events (the Buffer)

During the June 2016 meeting, the Council chose to increase its earlier FPA ACLs for canary rockfish, Pacific ocean perch (POP), and darkblotched rockfish. The resulting gains were not allocated to the fisheries, but were rather placed in off-the-top buffers to be made accessible to any sector (via the current inseason process) as a means to provide a hedge against unforeseen catch events (

).

Table 4-19 Buffers associated with the Council decision to revise and increase its FPA ACLs.

	Canary Rockfish		**Pacific Ocean Perch**		**Darkblotched Rockfish**	
	2017	**2018**	**2017**	**2018**	**2017**	**2018**
ACL	1714	1526	281	281	641	653
Buffer	188	0	25	25	50	50
Fishery HG	1467	1467	232	232	564	576

Projected Chinook salmon impacts associated with raising the ACLs to add buffers were examined by the GMT (Agenda Item G.4.b, Supplemental GMT Report 3). Since adding the buffers did not change the fishery allocations from what was modeled under the Council's Alternative 3, which covered the full suite of harvest specifications for all groundfish and covers Alternative 2 in this EA, the GMT concluded there would be no additional impacts if the buffers were not used. The buffer approach is not expected to result in changes in fishing behavior, compared to Alternative 1, because the sectors would continue to be managed within the existing management system, which is designed to increase access to target species while minimizing bycatch interactions (e.g., individual accountability and co-op management in the trawl sectors). Furthermore, there is no guarantee that the buffer would be released, and there would be limited access to it since the recommendation to release a buffer could only occur during a Council meeting through routine inseason action with implementation occurring several weeks later. That is, it would be impractical and inefficient to design fishing operations based on potential access to the buffer. Since access to the buffer would not be guaranteed, the GMT concluded that creation of the buffer would not increase the incentive to change fishing patterns to be less averse to avoiding bycatch. In addition, the GMT examined Chinook salmon bycatch patterns in the trawl fisheries and concluded that there would be no additional impacts if the buffers were used. This is because when the GMT examined the relationship between the ACLs for canary rockfish, POP, and darkblotched rockfish, no correlation was found between increased ACLs for these species and increased Chinook salmon catch for either the at-sea whiting sectors or IFQ. During the past decade, attainments of Chinook salmon in the at-sea whiting sectors have been 30 percent to 75 percent of their 11,000 threshold in all years, except 2014. Therefore, were the full buffers amounts distributed inseason, it is unlikely this would result in substantial impacts on Chinook salmon.

For the IFQ fisheries, use of the buffers would not be expected to alter fishing activity, or to affect bycatch of Chinook salmon, which has been less than 1,000 fish per year. This is because (1) the buffers would not be made available until the end of the year; (2) the buffers would have to be divided among each of the IFQ quota shareholders; (3) given that the buffers are not very large, the amount to each shareholder would be relatively small; (4) individual attainments relative to their current annual vessel limits are already low for these species (i.e., mainly within 50 percent); and (5) IFQ sector attainments of these species are also generally low.

In summary, release of the buffers to the IFQ sector would not be expected to alter fishing activity in a given year, but could be helpful for those that exceed their annual vessel limits by increasing the maximum pounds they could buy to help cover their deficits. Therefore, there would be no expected significant impacts other than those previously analyzed in the 2015 EIS from the creation of the buffer.

4.2.4 Socioeconomic Resources

4.2.4.1 Alternative 1

The impacts on socioeconomic resources have not significantly changed since the 2015 EIS. See Chapter 4.3 of the 2015 EIS for the effects of the fishery on socioeconomic resources.

4.2.4.2 Alternative 2 (Preferred Alternative)

The effects of Alternative 2 are discussed in the sections below. There is no new information to suggest that the impacts of Alternative 1 have changed since they were analyzed in the 2015 EIS.

4.2.4.2.1 Classification of Big Skate in the Fishery Management Plan

No socioeconomic impacts would be anticipated from this measure compared to Alternative 1 because big skate are currently being harvested, and this measure would not allow expanded harvest opportunity. While more formal allocations are to be enacted for trawl and non-trawl fisheries, there would most likely be little to no change in the distribution of catch opportunity. The allocations between sectors were based on historical landings; therefore, they should adequately cover landings (targeting and bycatch) in the future.

There would be no difference in trip limits from Alternative 1. However, trip limits could be adjusted inseason to allow for additional opportunity or to decrease effort to keep mortality within the ACL. While all fisheries under Alternative 2 would be required to have a sorting requirement for big skate, only the Shorebased IFQ fishery would be affected, as it lands the majority of big skate and would continue to be managed by trip limits. This would not be a change for the Shorebased IFQ fishery since it already sorts big skate. Furthermore, the harvest specifications for big skate are based off a Category 2 DB-SRA assessment from 2014. If a new assessment were to be done, an increase or decrease in the ACL could result in higher or lower trip limits. Therefore, there would be no significant impacts to socioeconomic resources under this management measure.

4.2.4.2.2 Oregon Recreational Flatfish Fishery

Alternative 2 would likely provide a small positive economic benefit compared to Alternative 1 due to increased catch opportunity. This management measure would allow some additional opportunity for the Oregon recreational groundfish fishery. Between 2009 and 2015, there were fewer than 200 angler trips with flatfish landings combined. Annual total groundfish angler trips average over 70,000. Figure 4-8 shows the percentage of those trips from the Oregon recreational groundfish fishery that landed flatfish and the number of flatfish landed per day per person. The current daily bag limit for flatfish species, other

than Pacific halibut, is 25 per angler per day; however, more than 70 percent (138 out of 195) of the groundfish trips that had flatfish landed had only one fish. Less than 5 percent of trips reported landing more than 10 flatfish.

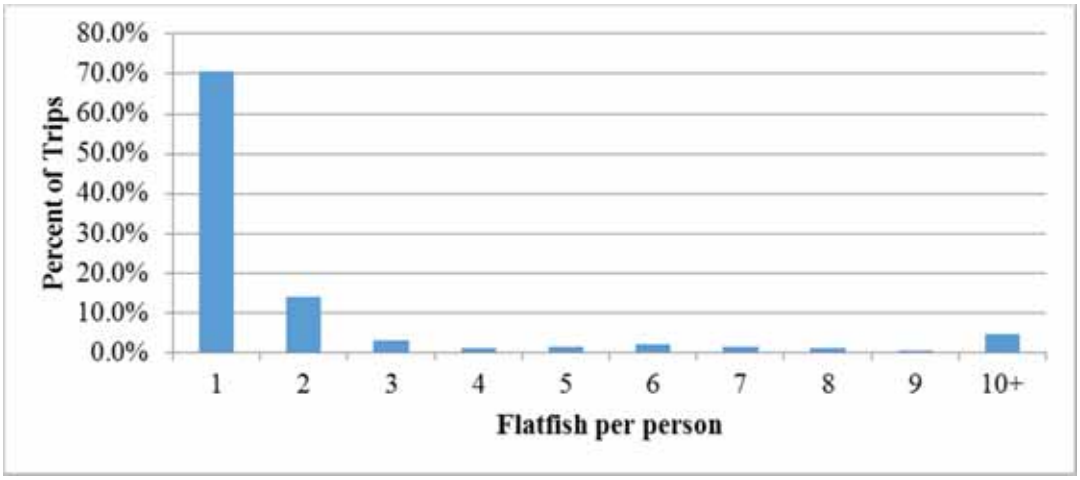


Figure 4-8. Percent of angler trips with number of flatfish landed per person.

Given the underutilization of the flatfish species and the impacts on flatfish under current regulations, this management measure would not likely impact any other user groups or affect an area's opportunity to harvest any of the species involved. Therefore, there would be no significant impacts on socioeconomic resources under this management measure.

4.2.4.2.3 New Inseason Process for California Recreational and Commercial Fisheries

Alternative 2 would have a neutral to positive effect on the distribution of catch opportunities among user groups, fishing communities, or regions compared to Alternative 1. The scope and severity of options available to address management issues would depend largely on the amount of time between when an issue was identified and when corrective action could be implemented. If corrective actions were needed under the proposed measure, NMFS would have more options to address the issue (i.e., reduce bag/trip limits in lieu of closing a fishery) and could implement them more quickly than a routine inseason adjustment could be enacted at a Council meeting. Therefore, there would be less impact on the fleets and the coastal communities. Otherwise, more severe corrective actions (e.g., closing a fishery) causing greater economic impacts would be imposed on the fleets and the coastal communities that depend on the revenues generated from these fisheries. Therefore, there would be no significant impacts on socioeconomic resources occur under this management measure.

4.2.4.2.4 Petrale Sole and Starry Flounder Season in California Recreational Fishery

This management measure would likely allow some increased opportunity by permitting petrale sole and starry flounder to be retained year-round. Therefore, it might have a small positive effect on catch opportunity compared to Alternative 1. This would mainly affect recreational anglers from the California/Oregon Border to Point Conception. While some petrale sole are encountered in the recreational fishery south of Point Conception, other opportunities are available in this area, and they do not have bycatch of petrale sole (e.g., Highly Migratory Species). The range of starry flounder extends north of Point Conception. As a result, this management measure would likely affect anglers in this region. However, given the previously low landings, any effect would not expected to be significant. Given the underutilization of petrale sole and starry flounder, this management measure would not likely impact any other user group's or area's harvest opportunity. Therefore, there would be no significant impacts on socioeconomic resources under this management measure.

4.2.4.2.5 Deduction from the Annual Catch Limit to Account for unforeseen Catch Events

Under the buffer approach, all sectors would receive lower allocations than if the entire ACL were allocated (Table 4-18). In other words, there is potential foregone yield by all sectors (either through targeting or increased access to bycatch) by establishing the buffer under Alternative 2. The forgone yield resulting from implementing the buffer could be considered the price for addressing uncertainty in the assessment and projected catches, as well as future management of the fishery (i.e., uncertainty regarding what level of targeting might occur), while achieving conservation goals and objectives and providing stability in management of the fishery, as envisioned in the FMP and under MSA. Overall, however, the forgone yield is expected to be minimal, since historical ACL attainment for these species has been low. From 2011 to 2014, on average, 42 percent of the canary ACLs were attained, 41 percent of the darkblotched ACLs, and 35 percent of the POP ACLs (see WCGOP Groundfish Mortality Reports). Therefore, no significant socioeconomic impacts are expected from this new measure.

5.0 CUMULATIVE EFFECTS

The 2015 EIS (NMFS 2015) includes an analysis of the cumulative effects of biennial management under the PCGFMP framework. That EIS addresses the significance of the expected cumulative impacts as they relate to the federally managed groundfish fishery. This analysis is incorporated by reference and summarized here. New information indicating potential changes in cumulative effects is also presented.

5.1.1 Affected Resources

In Chapter 3 the resources affected by the proposed action are identified and are carried forward for the cumulative effects analysis. Those resources are as follows:

- Physical environment, including EFH
- Groundfish
    - Widow rockfish
    - Darkblotched rockfish
    - POP
    - Big skate
- Protected species
    - Eulachon
    - Short-tailed albatross
    - Salmon
    - Other listed and protected species
- Socioeconomic environment

5.1.2 Geographic Boundaries

The analysis of impacts focuses on actions related to the management unit of species in the Groundfish FMP. The geographic scope of the affected resources listed above is the EEZ of the states of Washington, Oregon, and California.

5.1.3 Temporal Boundaries

The temporal scope of past and present actions for the affected resources encompasses actions that occurred after FMP implementation (1982) and, more specifically, since the implementation of the last harvest specifications and management measures. For endangered species and other protected resources, the scope of past and present actions is determined by analysis pursuant to ESA and the Marine Mammal

Protection Act (MMPA), including BiOps for the groundfish fishery and marine mammal stock assessment reports. The temporal scope of future actions for all affected resources extends approximately 15 years into the future. This period was chosen to characterize conditions during future biennial management periods for which harvest specifications and management measures will be set.

5.2 Effects of Past, Present, and Reasonable Foreseeable Future Actions other than the Proposed Action

A regular cycle of stock assessment, setting harvest specifications, and establishing related management measures allows the Council and NMFS to assess the status of the fisheries and to make necessary adjustments to ensure that there is a reasonable expectation of meeting the objectives of the Groundfish FMP and MSA, especially the objective of achieving OY while preventing overfishing. Achieving OY involves monitoring stock characteristics (fishing mortality, recruitment, etc.) and formally assessing stocks where the data are available. The management framework is adaptive such that the receipt of new information informs decisions about setting harvest limits in future years through each biennial harvest specifications cycle. Compliance with this regulatory regime should result in positive long-term outcomes, taking into account the cumulative impacts of past, present, and reasonably foreseeable future Federal fishery management actions. Limiting fishing effort through regulatory actions can often have negative short-term socioeconomic impacts. These impacts are usually necessary to bring about long-term sustainability of a given resource, which should, in the long term, promote positive effects on human communities, especially those that are economically dependent upon groundfish stocks.

The 2015 EIS identifies and describes fishery management actions contributing to cumulative effects: 1) past groundfish harvest specifications and management measures, 2) review of groundfish EFH designation and mitigation measures, 3) the Council's Fishery Ecosystem Plan, 4) regulatory adjustments to the trawl rationalization program, 5) seabird avoidance measures, and 6) regulation of fisheries for species other than groundfish. These actions have progressed since the 2015 EIS was prepared, and new actions listed below are included in the foreseeable future. Information on regulatory implementation of actions in these categories and initiation of new actions can be found on the NMFS WCR website and the Council's website. Another source of information for ongoing actions is Agenda Item F.1.a, NMFS Report 2, September 2016, which presents NMFS's rulemaking plan for 2016-2017 for groundfish and halibut fisheries. These actions are briefly summarized below.

Since implementation of the 2015-2016 biennial harvest specifications and management measures in 2015, various other regulatory actions established Pacific whiting and Pacific halibut allocations and inseason management to achieve ACLs. Other measures of a primarily technical nature, such as

specifications for vessel monitoring systems (VMS) and regulations for midwater trawl fisheries, were implemented. The Council is considering several other regulatory actions, which are discussed below. In addition, Amendment 24 to the PCGFMP was approved.

Past and present fishery management actions and their effects are described in Chapter 3. In addition to fishery management actions, other past, present, and reasonably foreseeable future actions are considered (e.g., responses to water pollution and climate change). Cumulative effects result from the combination of the effects of these past and present actions, reasonably foreseeable future actions, and the proposed actions. Ongoing and reasonably foreseeable actions with detectable effects are summarized below. Establishing harvest specifications and management measures for future bienniums would be part of the proposed action.

5.2.1 Fishery-related Actions

Past groundfish harvest specifications and management measures

Past harvest specifications contribute to the current status of managed stocks. Management measures directly or indirectly control catch, thereby affecting stock status, fishing opportunity, harvester costs and net revenue, and personal income and employment in fishing communities.

Gear (Council has taken final action; NMFS is developing EIS.)

The EIS covers a suite of eight gear issues, as follows: (1) minimum mesh sizes, (2) measuring mesh size, (3) codend regulations, (4) selective flatfish trawl, (5) chafing gear, (6) multiple gears on board, (7) fishing in multiple management areas, and (8) fishing before previous catch is stowed. The purpose of this final action is to provide more flexibility in the configuration and use of gear for participants in the trawl rationalization program, while at the same time ensuring that conservation objectives are met. Such flexibility is expected to foster innovation and enable more optimal harvest operations. Benefits may include increased efficiency through reduced costs and increased revenues. The Council chose a final preferred alternative for this action at its March 2016 meeting. NMFS is currently analyzing potential impacts from the gear change rule. Because the trawl fishery will be managed with harvest specifications based on the best available science and with habitat protections such as closed areas, the incremental impact of the proposed action analyzed in this EA is not expected significantly to increase any potential impacts analyzed in the gear changes EIS. Moreover, the gear changes EIS will consider cumulative impacts from other actions, including the 2017-2018 harvest specifications and proposed management measures, in compliance with NEPA.

Revised A-21 Set aside changes (Council final action scheduled for September 2016)

This action would not change the Amendment 21 formal allocations of darkblotched rockfish and POP. Instead, it would manage the amounts allocated to the at-sea whiting sectors as yield set asides rather than hard bycatch caps. At the June 2016 meeting, the Council took final action on this proposal and recommended that the action include an automatic closure provision should the entire buffer amounts be taken. There would be a potential low negative effect from this action because it could increase catch by allowing fishing above a sectors allocation. Any exceedances would not likely be significant because the Council included an automatic closure provision to this action should the entire buffer amount be projected to be taken, and NMFS could still close fishing should catch exceed an ACL. Further, given the precautionary reductions between OFL and ACL, any exceedances would not likely result in overfishing. As stated in the buffer section above, it would be inefficient to plan a fishing strategy based on exceeding the at-sea set aside amounts because the distribution of the buffer is uncertain, would require an inseason action, and the Council could still close the fishery through routine inseason action. Final Council final action is scheduled in September 2016.

Fishery monitoring (various stages)

Various proposals related to fishery monitoring are in the implementation phase or under Council consideration. These include rulemaking to implement an electronic monitoring (EM) program for the LE midwater trawl vessels in the Pacific whiting fishery that fish in the MS and Shorebased IFQ Program, as well as an EM program for LE trawl vessels that use fixed gear to harvest fish under the Shorebased IFQ program. In addition, the Council is considering new requirements to monitor vessel movements and is continuing to develop an electronic monitoring program for the non-whiting midwater trawl and bottom trawl fisheries under the Shorebased IFQ Program. There would be potential positive effects from more timely catch and effort data, which could lead to improved inseason management because adjustments to fisheries would be based on more real time data instead of delayed information.

Limited entry fixed gear sablefish changes (Proposed Rule published)

This includes allowing joint registration of a vessel to both limited entry trawl and fixed gear permit endorsements. The action would allow IFQ and fixed gear vessel allocations to be fished simultaneously. The expected change in impact from this action would be minimal because it would be largely administrative and would not likely significantly change the time, area, or gear used in the sablefish fishery.

Widow rockfish reallocation (Proposed Rule published)

This action would reallocate widow rockfish QS among initial recipients. The reallocation is being considered because of the newly rebuilt status of widow rockfish. This action, combined with the proposed action, may affect individuals who fish with midwater gear. Like whiting, the directed widow rockfish fishery is primarily conducted with midwater gear. Up through recent years, including the years in which allocation was based on the Amendment 20 widow rockfish QS allocation, widow rockfish has been used primarily to cover bycatch. If widow rockfish were reallocated to provide quota to permits for vessels that targeted it historically, there would likely be an overlap with the permits and vessels that target whiting, resulting in a potential benefit to those permits from the reallocation of widow rockfish. This action might affect individuals who fish with midwater gear, but it would not alter the environmental or socioeconomic effects at the fleet, community, or governmental agency management levels. There would be no significant cumulative effects associated with this action.

ESA consultations (ongoing)

NMFS is evaluating the effect of the groundfish fishery on ESA-listed salmonids. In April, June, and September 2015 and in March 2016, NMFS briefed the Council on elements to be considered in the consultation, including mitigation measures. The consultation may be completed before or during the 2017-2018 management period. New mitigation measures could be implemented. NMFS reinitiated section 7 consultation on the effects of the groundfish fishery on the endangered short-tailed albatross. Following recommendation from the Council's ESA Workgroup, NMFS reinitiated consultation on eulachon for the groundfish fishery.

The increased widow rockfish ACL, the potential revised Amendment 21 set aside, and the reallocation of widow rockfish would have the potential for increased negative impacts on Chinook salmon because of an increase in the use of midwater gear. Projected Chinook salmon bycatch associated with re-emergence of the midwater rockfish trawl fishery would be heavily contingent on the uncertain future attainment rates of widow rockfish and yellowtail rockfish ACLs; however, projected bycatch of Chinook salmon would likely be within the 6,000-fish incidental take amount. This means that the expected impact would be low, because this amount of take would be low compared to the overall Chinook population. The new BiOp, when completed, could result in implementation of mitigation measures that would further address any potential negative impacts from the emerging midwater fishery. Any mitigation measures would likely have low positive impacts on groundfish as they would likely reduce catch and move fishing operations by implementing closed areas with high groundfish abundance that overlap with salmon.

Comprehensive ecosystem-based management (Effective May 2016)

These measures prevent the development of fisheries targeting certain forage species without first undergoing a careful review in the Council process. Incidental landings of these forage species are also limited in currently authorized fisheries. This measure could have positive environmental and biological impacts associated with forage fish and unmanaged fish protection. Such protections could accrue benefits to managed species such as groundfish, which depend on forage fish and some unmanaged fish for their survival and reproduction. In the context of regulations that may impose further restrictions on harvest of forage species, alternatives that alleviate production costs may be more beneficial to stability in the industry than would be the case if harvest conditions were expected to remain stable.

5.2.2 Non-fishing Actions

The 2015 EIS identified the following actions not related to fishing that could contribute to the cumulative effects of the proposed action: water pollution, other authorities to conserve biological resources affected by the proposed action, and cyclical and ongoing climate change. Potential climate change effects are described as part of the affected environment in Chapter 3 of the 2015 EIS. Range shifts of target species might cause the biggest climate-change-related impact on fisheries in the foreseeable future. No other non-fishing actions discernably affecting the resources have been identified within the scope of the proposed action. There would be no significant cumulative effects associated with non-fishing actions and Alternative 1 or Alternative 2.

5.2.2.1 Physical environment, including EFH

There would be low to moderate positive cumulative impacts compared to Alternative 1. This is because external actions (existing EFH protections, EFH review process) have been implemented, and they might lead to additional measures to mitigate the adverse impacts of fishing on groundfish EFH.

5.2.2.2 Groundfish

There would be low positive cumulative effects on big skate, darkblotched rockfish, widow rockfish, and POP under Alternative 2, compared to Alternative 1, because the 2017-2018 harvest specifications and management measures, as well as long-term harvest policies, would be intended to return or to maintain stocks at levels at or above their target biomass levels. Fishing practices would not be likely to change the reproductive success of any stocks, and fishing mortality would not be likely to result in overfishing or stocks becoming overfished. The genetic structure of the groundfish stocks would not likely be affected by fishing under the groundfish FMP. There would be a risk that catch limits could be mis-specified and/or that management measures would not prevent ACLs from being exceeded. Because of

precautionary reductions built into the management framework, the likelihood that overfishing would occur is low. Over time, catch data systems and stock assessment techniques would improve, lessening the likelihood of mis-specification and/or overfishing.

5.2.2.3 Protected species

There would be low positive cumulative effects under Alternative 2, compared to Alternative 1, because external actions (e.g., ESA Section 7 consultations, MMPA permitting) would evaluate cumulative impacts and identify mitigation measures that might be required. Most protected species populations affected by the proposed actions are recovering.

5.2.2.4 Socioeconomic environment

There would be low positive cumulative effects compared to Alternative 1, because the 2017-2018 harvest specifications and management measures are forecast to result in increased ex-vessel revenue. Over the long term, year-to-year variations in ex-vessel revenue would be likely due to changes in target stocks' yield outside of the management system. However, there is no information indicating that year-to-year revenue volatility would exceed baseline variability. External factors (trawl rationalization) could lead to greater agglomeration and ex-vessel revenue being concentrated in fewer fishing communities.

5.2.3 Summary of the Effects of Past, Present, and Reasonably Foreseeable Future Actions not Identified in the 2015 EIS

The 2015 EIS evaluated direct, indirect, and cumulative effects on the following environmental components:

- Groundfish stocks
- Socioeconomic environment
- Essential fish habitat
- California Current ecosystem
- Protected species
- Non-groundfish species

Table 5-1 and Table 5-2 are excerpted from Section 4.15.6 in the 2015 EIS and have been updated based on the reasonably foreseeable actions discussed above. Table 5-1 summarizes the effects of past, present and reasonably foreseeable future actions, and Table 5-2 summarizes the cumulative, or combined, effects of the proposed action and other external actions.

The 2015 EIS concluded that cumulative effects on these environmental components ranged from neutral to moderately positive. The direct and indirect effects of the current proposed actions are disclosed and discussed in Section 2 and Section 3 of this document. The effects are within the scope of those identified for setting harvest specifications and implementing related management measures consistent with the PCGFMP framework as analyzed in the 2015 EIS. Therefore, when this action is considered in conjunction with all the other pressures placed on fisheries by past, present, and reasonably foreseeable future actions, it would not likely result in any significant impacts, positive or negative. Based on the information and analyses presented in past FMP documents and this document, there would be no significant cumulative effects associated with the proposed action.

Table 5-1. Summary effects of past, present, and reasonably foreseeable future actions on the environmental components evaluated in the 2015-2016 Groundfish Harvest Specifications EIS (Table 4-234).

Environmental Component	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Groundfish Stocks	**Mixed (Low Positive and Low Negative)** Most stocks are above or near target biomass; however, some stocks remain overfished.	**Low to Moderate Positive** The current management framework is effective in rebuilding stocks to the target biomass and achieving optimum yield (OY).	**Low Positive** No actions are identified that would reduce the effectiveness of the management framework.	**Low Positive** No actions are identified that would reduce the effectiveness of the management framework; however misspecification of catch limits and management error could occur; climate change may reduce local abundance.
Socioeconomic (Human Communities)	**Mixed (Low Positive and Low Negative)** Fishery resources have supported profitable industries, but management measures associated with stock rebuilding have curtailed fishing opportunities; trawl rationalization increased operational flexibility.	**Mixed (Low Positive and Low Negative)** Stock status and yield have allowed fishery revenues to increase; falling participation and agglomeration may concentrate revenues in fewer communities.	**Low Positive** No actions are identified that would accelerate falling participation and agglomeration.	**Low to Moderate Positive** Stock status and yield have allowed fishery revenues to increase; falling participation and agglomeration may concentrate revenues in fewer communities.

Table 5-1. Summary effects of past, present, and reasonably foreseeable future actions on the environmental components evaluated in the 2015-2016 Groundfish Harvest Specifications EIS (Table 4-234).

Environmental Component	Past Actions	Present Actions	Reasonably Foreseeable Future Actions	Combined Effects of Past, Present, Future Actions
Essential Fish Habitat	**Low to Moderate Positive** Evidence suggests that trawl fishing effort is falling; past actions have mitigated adverse effects of fishing on EFH.	**Mixed (Low Positive and Low Negative)** Trawl fishing effort stable; ongoing actions continue to mitigate adverse effects of fishing on EFH; Trawl RCA boundary change proposed.	**Low Positive** Trawl fishing effort is not likely to increase; future actions are likely to enhance the mitigation of adverse effects of fishing on EFH.	**Low to Moderate Positive** Trawl fishing effort is not likely to increase; future actions are likely to enhance the mitigation of adverse effects of fishing on EFH.
California Current Ecosystem	**Mixed (Low Positive and Low Negative)** Based on simulations, the development of fisheries has had both positive and negative indirect effects on ecosystem attributes.	**Neutral** Ongoing prosecution of fisheries at current levels is not expected to change ecosystem attributes from the baseline; other actions are likely have negligible impacts.	**Mixed (Low Positive and Low Negative)** Ongoing prosecution of fisheries at current levels is not expected to change ecosystem attributes from the baseline; climate change is likely to have moderate to substantial impacts.	**Neutral** Ongoing prosecution of fisheries at current levels is not expected to change ecosystem attributes from the baseline; climate change is likely to have moderate to substantial impacts.
Protected Species	**Mixed (Low Positive and Low Negative)** Protected species take is modest in groundfish fisheries and documented through observer program; requirements of ESA, and MMPA are implemented.	**Low Positive** Most populations are increasing; ESA and MMPA mitigation is addressed and ongoing.	**Low Positive** Most populations are increasing; future adverse effects are likely to be addressed through ESA and MMPA.	**Low Positive** Most populations are increasing; adverse effects are likely to be addressed through ESA and MMPA.
Non-groundfish Species	**Neutral** Bycatch in groundfish fisheries is negligible.	**Neutral** Bycatch in groundfish fisheries is negligible.	**Neutral** Bycatch in groundfish fisheries is negligible.	**Neutral** Bycatch in groundfish fisheries is negligible.

Table 5-2. Summary of the cumulative effects of the proposed actions in the 2015-2016 Groundfish Harvest Specifications EIS (Table 4-235) and the proposed action in this EA.

Affected Resources	Baseline*	Past, Present, and Reasonably Foreseeable Future Actions	2015-2016 Harvest Specifications and Management Measures	Amendment 24	Proposed Action	Cumulative Effects
Groundfish Stocks	Low to Moderate Positive (Section 3.1)	Low Positive	Low Positive	Neutral	Low Positive	Low Positive
Human Communities	Mixed (Low Positive and Low Negative) Section 3.2)	Mixed (Low to Moderate Positive)	Low Positive	Mixed (Low Positive and Low Negative)	Low Positive	Low Positive
Essential Fish Habitat	Low to Moderate Positive (Section 3.3)	Low Moderate Positive	Mixed (Low Positive and Low Negative)	Neutral	Neutral	Low to Moderate Positive
California Current Ecosystem	Neutral (Section 3.4)	Neutral	Neutral	Neutral	Neutral	Neutral
Protected Species	Low Positive (Section 3.5)	Low Positive	Neutral	Neutral	Neutral	Low Positive
Non-Groundfish Stocks	Neutral (Section 3.6)	Neutral	Neutral	Neutral	Neutral	Neutral

* Although the temporal scope of past and present actions for the affected resources encompasses actions that occurred after FMP implementation (1982), the baseline period is 2003 to 2012, which is the temporal context within which affected resources are described in Chapter 3 of the 2015 EIS.

6.0 OTHER APPLICABLE LAW

6.1 Endangered Species Act (ESA)

The Endangered Species Act of 1973 (ESA) was signed on December 28, 1973, and it provides for the conservation of species that are endangered or threatened throughout all or a significant portion of their range, and the conservation of the ecosystems on which they depend. ESA replaced the Endangered Species Conservation Act of 1969; it has been amended several times.

A species is considered endangered if it is in danger of extinction throughout all or a significant portion of its range. A species is considered threatened if it is likely to become an endangered species within the foreseeable future.

Federal agencies are directed under ESA section 7(a)(1) to utilize their authorities to carry out programs for the conservation of threatened and endangered species. Federal agencies must also consult with NMFS or USFWS, under ESA section 7(a)(2), on activities that may affect a listed species. These interagency consultations, or section 7 consultations, are designed to assist Federal agencies in fulfilling their duty to ensure that Federal actions do not jeopardize the continued existence of a species or destroy or adversely modify critical habitat. Should an action be determined to jeopardize a species or result in the destruction or adverse modification of critical habitat, NMFS or USFWS will suggest reasonable and prudent alternatives that would not violate section 7(a)(2).

BiOps document whether the Federal action is likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat. Where appropriate, biological opinions provide an exemption for the take of listed species, while specifying the extent of take allowed, the reasonable and prudent measures necessary to minimize impacts from the Federal action, and the terms and conditions with which the action agency must comply.

On December 7, 2012, NMFS completed a BiOp concluding that the groundfish fishery is not likely to jeopardize non-salmonid marine species including listed eulachon, green sturgeon, humpback whales, Steller sea lions, and leatherback sea turtles. The opinion also concludes that the fishery is not likely to modify critical habitat adversely for green sturgeon and leatherback sea turtles. An analysis included in the same document as the opinion concludes that the fishery is not likely adversely to affect green sea turtles, olive ridley sea turtles, loggerhead sea turtles, sei whales, North Pacific right whales, blue whales, fin whales, sperm whales, Southern Resident killer whales, Guadalupe fur seals, or the critical habitat for Steller sea lions.

On November 21, 2012, USFWS issued a BiOp concluding that the groundfish fishery will not jeopardize the continued existence of the short-tailed albatross. USFWS also concurred that the fishery is not likely to adversely affect the marbled murrelet, California least tern, southern sea otter, bull trout, nor bull trout critical habitat.

6.2 Magnuson-Stevens Fishery Conservation and Management Act (MSA)

National Standard 1 states that conservation and management measures shall prevent overfishing while achieving, on a continuing basis, the OY from each fishery for the United States fishing industry.

MSA section 303(a)(3) requires that each FMP include an estimate of MSY and OY for the fishery. OY is the amount of fish that will provide the greatest overall benefit to the U.S., particularly with respect to food production and recreational opportunities, and taking into account the protection of marine ecosystems. OY is prescribed as such based on the MSY from the fishery, as reduced by any relevant economic, social, or ecological factor, and, in the case of an overfished fishery, it provides for rebuilding to a level consistent with producing the MSY in such fishery.

The harvest specification action alternatives are consistent with the OY harvest management framework described in Chapter 4 of the Groundfish FMP. The FMP Chapter 4 describes OY as "a decisional mechanism for resolving the Magnuson Stevens Act's multiple purposes and policies, implementing an FMP's objectives and balancing the various interests that comprise the national welfare." The OYs are based on MSY or MSY as reduced in consideration of social, economic, or ecological factors. The most important limitation on the specification of OY is that the choice of OY and the conservation and management measures proposed to achieve it must prevent overfishing (50 CFR Section 600.310(b)). In establishing OYs, the interim step of calculating OFLs, ABC, and ACLs is taken (FMP Section 4.1). OFL is the MSY harvest levels associated with the current stock abundance. Over the long term, if OFLs are fully harvested, the average of the OFLs would be MSY. ABC is a threshold below the OFL, which accounts for scientific uncertainty in the estimate of OFL. ACL is a harvest specification set at or below ABC, and it is intended to prevent overfishing. The ACLs are established to achieve OY. The OY for a stock or stock complex is the long- term average of the stock or stock complex ACLs.

The OFL is the estimate of catch level above which overfishing is occurring, or the estimate of maximum fishing mortality threshold applied to a stock's abundance. The ABC is a level of annual catch that accounts for the scientific uncertainty in the estimate of OFL and any other scientific uncertainty. Chapter 4 in the Groundfish FMP describes an ABC control rule. ABC values described in this document were

determined following that control rule. The ACL is the level of annual catch that serves as the basis for invoking accountability measures. The ACL may equal, but may not exceed, the ABC. The ACL may be set lower than the ABC to account for a wide range of factors. The application of the OY harvest management framework to the specifications described in this document should result in ACLs that reduce the likelihood of overfishing.

Because of past overfishing, seven groundfish stocks are currently declared overfished. Widow rockfish was determined to be rebuilt in 2011 and was no longer managed under a rebuilding plan beginning in 2013. The 2015 darkblotched rockfish assessment projects the stock will be rebuilt by the start of 2016 before new harvest specifications are implemented in 2017. The Council recommended implementing the default HCR for healthy stocks based on a projection that the stock would be rebuilt in 2016. The HCR for the POP rebuilding plan is projected to maintain the current rebuilding plan T_{TARGET} with a less than 1 percent decrease in the probability of reaching the T_{TARGET}.

The species-specific harvest specifications for big skate are needed because the stock is being targeted and can no longer be designated as an EC species. The OFLs in this EA are based on an estimate of abundance from the recurring bottom trawl survey.

Section 304(e) introduces a tradeoff formulated as specifying a time to rebuild "as short as possible, taking into account the status and biology of any overfished stocks, the needs of fishing communities, … and the interaction of the overfished stock of fish within the marine ecosystem…." The Council took into account this tradeoff for overfished stocks and, based on the best available science (the most recent stock assessment results), did not consider alternative HCRs for the four overfished stocks enumerated above.

National Standard 2 states that conservation and management measures shall be based on the best scientific information available.

The best available science was used in the development of stock assessments, rebuilding analyses, and methods for determining management reference points (OFL, ABC, ACL, etc.). These areas form the basis for determining harvest levels and the evaluation of socioeconomic impacts. The supporting science is discussed below.

The harvest specifications (specifically, ACLs) considered under the proposed action (the action alternatives, including Alternative 2), are based on the most recent stock assessments, developed through the peer-review STAR process. As part of the management cycle, the Council recommends which stocks should be assessed in advance of current decision-making. Only a small proportion of the more than 80 managed groundfish species are regularly assessed because of a combination of factors. For many

stocks, there may not be enough data to support a full assessment (the FMP describes a classification system based on the availability of data). For unassessed stocks, proxy methods must be used to determine reference points. Stocks may be subjected to little or no fishing pressure, or determined to have low vulnerability, and, thus, be less in need of regular assessment.

Finally, there is a limit on the institutional resources needed to carry out the assessments (i.e., fishery scientists). In some cases, a previous assessment may be updated. This means that the underlying model is not reevaluated, but the model is re-run with the addition of more recent data from the period since the last full assessment. The 2016 Groundfish SAFE document reviews the basis for alternative harvest specifications and references the stock assessments that were used. It also describes the methods that were used to determine reference points for harvest specifications (OFL, ABC, ACL, etc.) for stocks and stock complexes.

The NWFSC has developed a model application, called IOPAC, for estimating personal income impacts of commercial fishing on the West Coast. This model is documented in Appendix A. NMFS and the Council used the best available scientific information in developing all of the proposed actions.

National Standard 3 states that, to the extent practicable, an individual stock of fish shall be managed as a unit throughout its range, and interrelated stocks of fish shall be managed as a unit or in close coordination.

Groundfish ACLs are set for management units, which include stocks, stock complexes, or geographic subdivisions thereof. Stock complexes group co-occurring species, many of which have not been formally assessed. POP is managed within the Minor Slope rockfish complex in the area south of 40° 10’ N. latitude and as a single species north 40° 10’ N. latitude. Widow, big skate, and darkblotched rockfish are managed on a coastwide basis.

The 2016 Groundfish SAFE document describes how ACLs for stock complexes are developed, based on ABC estimates of component stocks. Stocks within these complexes are not managed individually for a variety of reasons, including lack of assessments, lack of reliable catch data at the species level, or the fact that they constitute a small portion of catches. If a stock within a complex is individually assessed, it may be managed under a separate harvest limit, when practicable.

Stocks with their own ACLs are managed throughout the range of that stock (as opposed to the species), although issues do arise in the case of stocks straddling international borders. For this reason, allocation of the harvestable surplus of Pacific whiting between the U.S. and Canada is subject to international agreement. Separate ACLs may be set for geographic subcomponents of a stock for management

purposes. However, the development of subcomponent ACLs is based on managing these stocks throughout their range within U.S. waters.

National Standard 4 states that conservation and management measures shall not discriminate between residents of different states. If it becomes necessary to allocate or assign fishing privileges among various United States fishers, such allocation shall be (A) fair and equitable to all such fishers; (B) reasonably calculated to promote conservation; and (C) carried out in such manner that no particular individual, corporation, or other entity acquires an excessive share of such privileges.

The proposed measures will not discriminate between residents of different states. Allocation decisions are also made as part of the biennial harvest specifications process for those stocks for which formal allocations have not been established under the FMP.

Big skate is the only species in this EA that does not have a formal allocation that was established through Amendment 21 of the PCGFMP. Therefore, big skate allocations will be established every biennium as part of the harvest specifications and management measures process, until modified. Chapter 3 in the Council analytical document describes these allocation decisions. Emphasis is placed on equitable division, while achieving conservation goals. Decision-making on these allocations occurs through the Council process, which facilitates substantial participation by state representatives and the public. Generally, state proposals are brought forward when alternatives are crafted and integrated to the degree practicable. Widow rockfish, POP, and darkblotched rockfish all have allocations to the trawl and non-trawl fisheries that were established through Amendment 21 to the PCGFMP.

National Standard 5 states that conservation and management measures shall, where practicable, consider efficiency in the utilization of fishery resources; except that no such measure shall have economic allocation as its sole purpose.

Measures have been taken to reduce fishing capacity in the limited entry trawl fleet and non-trawl fleets. These measures include the fixed gear permit stacking program implemented by FMP Amendment 14, the trawl vessel buyback program, and catch share management implemented by FMP Amendment 20.

Reducing excess capacity is expected to improve the efficiency in the utilization of fishery resources as well as reduce the levels of incidental catch. Catch share management in the at-sea whiting sectors and the shorebased IFQ fishery promote efficiency of utilization by reducing regulatory discards. Vessels in these fisheries are subject to 100 percent observer coverage, which improves catch accounting.

National Standard 6 states that conservation and management measures shall take into account and allow for variations among, and contingencies in, fisheries, fishery resources, and catches.

The new management measures proposed in this EA reflect differences in catch, and, in particular, bycatch, of overfished species, among different fisheries. For example, changes to flatfish retention in both the California and Oregon recreational fisheries are proposed to address different needs in each state. The harvest specifications are also proposed to address variations among different commercial fisheries that catch the species in this EA.

National Standard 7 states that conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication.

Generally, by coordinating management, monitoring, and enforcement activities between the three West Coast states, duplication and costs are minimized.

National Standard 8 states that conservation and management measures shall, consistent with the conservation requirements of this Act (including the prevention of overfishing and rebuilding of overfished stocks), … take into account the importance of fishery resources to fishing communities in order to (A) provide for the sustained participation of such communities, and (B) to the extent practicable, minimize adverse economic impacts on such communities.

The 2015 EIS evaluates 2015-2016 harvest specifications and management measures, and Amendment 24 to the PCGFMP (PFMC and NMFS 2015) evaluates the long-term effects of alternative harvest management policies on fishing communities. The short-term impacts of the current proposed actions do not differ substantially in context or intensity from the impacts disclosed in the 2015 EIS (see Section 4.2). These effects were taken into account in choosing Alternative 2.

National Standard 9 states that conservation and management measures shall, to the extent practicable, (A) minimize bycatch and (B) to the extent bycatch cannot be avoided, minimize the mortality of such bycatch.

Minimizing bycatch, of overfished species in particular, is an important component of the alternatives. By using GCAs, fishing effort is reduced in areas where overfished species are most abundant, thereby reducing potential bycatch.

The at-sea whiting sectors are managed under bycatch limits for selected overfished species, including darkblotched rockfish and POP. Mandatory co-ops in the MS sector are allocated a portion of these sector bycatch limits and are accountable for keeping catch of these species within their allocation. The C/P sector operates as a single, voluntary co-op responsible for the bycatch limit assigned to the sector.

The at-sea whiting sectors and shorebased IFQ fishery are subject to 100 percent observer coverage. While necessary for catch accounting under IFQ/co-op management, observers also allow complete monitoring of total catch (including bycatch). The limited entry fixed gear sector and directed open access fisheries are subject to partial observer coverage. The observer data are used to develop bycatch rate estimates, which can be used to forecast and account for total catch of all managed species.

National Standard 10 states that conservation and management measures shall, to the extent practicable, promote the safety of human life at sea.

RCAs may affect safety if more vessels elect to fish seaward of the closed areas and are more exposed to bad weather conditions. Individual accountability under catch share management has resulted in vessels more often fishing seaward of the RCA to avoid catch of species such as canary rockfish and yelloweye rockfish, for which the allocations and resulting available QP are limited. As harvesters gain experience with the management program, they may be able to develop opportunities to fish shoreward of RCAs, while avoiding catch of these species, resulting in more inshore fishing. A study reported to the Council in the 2015 Annual State of the California Current Ecosystem Report (California Current Integrated Ecosystem Assessment Team 2015) found that since catch share (IFQ) management was implemented in the groundfish fishery "the overall average annual rate of fishing on high wind days to decrease by 85%, even accounting for the influence of safety trainings and other types of Coast Guard regulations that have varied over time" (p. 19).

The expiration of the moratorium on quota share trading may lead to further capacity reduction and increased profits in the trawl sector. This may result in more investment in vessels and equipment that would enhance safety. Less efficient vessels are expected to leave the trawl fishery as part of this consolidation, which may eliminate older, less safe vessels.

For vessels electing to increase the amount of time fishing seaward of RCAs, implementing a VMS capable of sending distress calls could provide some mitigation. Although units with this capability have been approved for use, vessel owners are not required to purchase a unit with this capability. Also, by providing near real-time vessel position data, VMS could aid in search and rescue operations.

Consistency of the Proposed Actions with Other Applicable MSA Provisions

Harvest specifications are set based on targets established in overfished species rebuilding plans, which conform to Section 304(e) Rebuild Overfished Fisheries. Rebuilding plans contain the elements required by Section 304(e)(4) and discussed in the NS1 Guidelines (50 CFR 600.310).

NMFS prepared an EIS evaluating programmatic measures designed to identify and describe West Coast groundfish EFH (NMFS 2005) and to minimize potential fishing impacts on West Coast groundfish EFH. The Council took final action amending the groundfish FMP to incorporate new EFH provisions in November 2005. NMFS partially approved the amendment in March 2006. Implementing regulations became effective in June 2006.

The effects of the proposed actions on groundfish EFH are within the scope of effects evaluated in the programmatic groundfish EFH EIS. The Council commenced a 5-year review of its groundfish EFH designation in December 2010. This process is ongoing; the Council is scheduled to choose a preferred alternative in early 2017. The current proposed actions are unlikely to result in adverse impacts on EFH outside those disclosed in Section 4.1.4 in the 2015 EIS. That EIS describes impacts of the groundfish management program on EFH, consistent with the EFH assessment requirements of 50 CFR 600.920 (e)(3). NMFS will compile any additional necessary information required to be contained in a fishery impact statement, Section 303a(9), for Amendment 27.

6.3 Marine Mammal Protection Act (MMPA)

The MMPA of 1972 is the principle Federal legislation that guides marine mammal species protection and conservation policy in the United States. Under MMPA, NMFS is responsible for the management and conservation of 153 stocks of whales, dolphins, porpoise, as well as seals, sea lions, and fur seals, while USFWS is responsible for walrus, sea otters, and the West Indian manatee.

Off the West Coast, the Guadalupe fur seal (Arctocephalus townsendi), and southern sea otter (Enhydra lutris) California stock are listed as threatened under ESA. The Steller sea lion (Eumetopias jubatus) eastern stock, sperm whale (Physeter macrocephalus) Washington, Oregon, and California stock, humpback whale (Megaptera novaeangliae) Washington, Oregon, and California – Mexico stock, blue whale (Balaenoptera musculus) eastern north Pacific stock, and fin whale (Balaenoptera physalus) Washington, Oregon, and California stock, are listed as depleted under the MMPA. Any species listed as endangered or threatened under the ESA is automatically considered depleted under the MMPA.

Pursuant to the MMPA, the List of Fisheries classifies U.S. commercial fisheries into one of three categories, according to the level of incidental mortality or serious injury of marine mammals:

I. Frequent incidental mortality or serious injury of marine mammals

II. Occasional incidental mortality or serious injury of marine mammals

III. Remote likelihood of/no known incidental mortality or serious injury of marine mammals

The MMPA mandates that each fishery be classified by the level of serious injury and mortality of marine mammals that occurs incidental to each fishery and be reported in the annual Marine Mammal Stock Assessment Reports for each stock. On the 2016 List of Fisheries, the Washington/Oregon/California sablefish pot fishery is listed as a category II fishery due to interactions with humpback whales. All other West Coast groundfish fisheries are listed as category III fisheries.

As Steller sea lions and humpback whales are also protected under MMPA, incidental take of these species from the groundfish fishery must be addressed under MMPA section 101(a)(5)(E). On February 27, 2012, NMFS published notice that the incidental taking of Steller sea lions in the West Coast groundfish fisheries is addressed in NMFS' December 29, 2010, NID, and this fishery has been added to the list of fisheries authorized to take Steller sea lions (77 FR 11493, Feb. 27, 2012).

On September 4, 2013, based on its Negligible Impact Determination, dated August 28, 2013, NMFS issued a permit for a period of three years to authorize the incidental taking of humpback whales by the sablefish pot fishery (78 FR 54553). NMFS is currently developing MMPA authorization for the incidental take of humpback whales in the fishery. Commercial fishing vessels participating in Category I or II fisheries must be covered by a Federal permit under MMPA. For most fisheries, including all West Coast fisheries, a blanket permit is issued for all Federal or state permits authorizing participation in the fishery.

The minor change to midwater fishing in the trawl fishery is not likely to result in trawl fishery impacts on any marine mammal species over what was previously considered in the 2015-2016 Proposed Harvest Specifications and Management Measures EIS. The Council adopted an amendment to the PCGFMP that allows electronic monitoring in the Pacific whiting midwater trawl and fixed-gear segments of the groundfish fishery starting in 2017, the proposed rule for this action has been published. This will reduce the number of human observers on vessels but reporting of marine mammal interactions is still required.

6.4 Migratory Bird Treaty Act and Executive Order 13186

The MBTA of 1918 was designed to end the commercial trade of migratory birds and their feathers that, by the early years of the 20th century, had diminished the populations of many native bird species. The MBTA states that it is unlawful to take, kill, or possess migratory birds and their parts (including eggs, nests, and feathers), and it is a shared agreement between the United States, Canada, Japan, Mexico, and Russia to protect a common migratory bird resource. MBTA prohibits the directed take of seabirds, but the incidental take of seabirds does occur.

The proposed action is unlikely to cause the incidental take of seabirds protected by MBTA to differ substantially from levels previously considered in the 2015-2016 Proposed Harvest Specifications and Management Measures EIS. (Section 4.2.3 evaluated impacts of the proposed action on protected species, including seabirds).

6.5 Administrative Procedure Act (APA)

The Administrative Procedures Act, or APA, governs the Federal regulatory process and establishes standards for judicial review of Federal regulatory activities. Most Federal rulemaking, including regulations promulgated pursuant to MSA, is considered "informal," which is determined by the controlling legislation. Provisions at 5 U.S.C. 553 establish rulemaking procedures applicable to the proposed action. Section 6.2 in the Groundfish FMP (PFMC 2011) specifies that biennial harvest specifications and management measures require 'full notice-and-comment rulemaking' to implement the regulations necessary to implement the Council recommendation. The rulemaking associated with this proposed action will be conducted in accordance with the APA and procedures identified in MSA section 304.

6.6 Paperwork Reduction Act (PRA)

The Paperwork Reduction Act requires that agency information collections minimize duplication and burden on the public, have practical utility, and support the proper performance of the agency's mission. There is no Paperwork Reduction Act collection associated with this action.

6.7 Information Quality Act (IQA)

The Information Quality Act (Section 515 of the Treasury and General Government Appropriations Act for Fiscal Year 2001, Public Law 106-554), directed the White House Office of Management and Budget (OMB) to issue government-wide guidelines that "provide policy and procedural guidance to federal agencies for ensuring and maximizing the quality, objectivity, utility and integrity of information disseminated by federal agencies. OMB complied by issuing guidelines directing each federal agency to issue its own guidelines to ensure and maximize the quality, objectivity, utility and integrity of information disseminated by the agency. In fulfillment of this requirement, The National Oceanic and Atmospheric Administration (NOAA) issued the NOAA Information Quality Guidelines on October 1, 2002 (Revised November 6, 2006).

It is the policy of NMFS to comply with NOAA's Information Quality Guidelines. To achieve this policy objective, NMFS has developed procedures and guidance to assist staff with compliance with the NOAA Information Quality Guidelines. This policy directive directs staff to comply with the IQA and the NMFS

IQA procedures. The directive applies to all NMFS staff involved in the generation of information disseminated to the public and to those who review and approve such information prior to release.

The purpose of the NOAA Information Quality Guidelines is to provide guidance to NMFS staff for ensuring and maximizing the quality, objectivity, utility, and integrity of information disseminated by NMFS. NMFS has developed Information Quality Act implementation guidance to provide additional information to NMFS staff regarding the IQA and NOAA's Information Quality Guidelines.

6.8 Coastal Zone Management Act (CZMA)

Section 307(c)(1) of the Federal Coastal Zone Management Act (CZMA) of 1972 requires that all Federal activities directly affecting the coastal zone be consistent with approved state coastal zone management programs to the maximum extent practicable. A determination as to whether the proposed action would be implemented in a manner that is consistent to the maximum extent practicable with the enforceable policies of the approved coastal zone management programs of Washington, Oregon, and California will be submitted to the responsible state agencies for review under CZMA Section 307(c)(1). The relationship of the groundfish FMP with the CZMA is discussed in Section 11.7.3 of the Groundfish FMP. The Groundfish FMP has been found to be consistent with the Washington, Oregon, and California coastal zone management programs.

6.9 Executive Order 12866 (Regulatory Impact Review)

EO 12866, Regulatory Planning and Review, covers a variety of regulatory policy considerations and establishes procedural requirements for analysis of the benefits and costs of regulatory actions. It directs agencies to choose those approaches that maximize net benefits to society, unless a statute requires another regulatory approach. The agency must assess both the costs and the benefits of the intended regulation and, recognizing that some costs and benefits are difficult to quantify, propose or adopt a regulation only after a reasoned determination that the benefits of the intended regulation justify the costs. In reaching its decision, the agency must use the best reasonably obtainable information, including scientific, technical and economic data, about the need for and consequences of the intended regulation.

NMFS requires the preparation of a regulatory impact review (RIR) for all regulatory actions of public interest. The purpose of the analysis is to ensure that the regulatory agency systematically and comprehensively considers all available alternatives, so that the public welfare can be enhanced in the most efficient and cost-effective way. The RIR addresses many of the items in the regulatory philosophy and principles of EO 12866. A separate RIR and regulatory Flexibility Act Analyses will be prepared for the rulemaking to implement the FPA.

6.10 Executive Order 13132 (Federalism)

EO 13132, which revoked EO 12612, an earlier federalism EO, enumerates eight "fundamental federalism principles." The first of these principles states "Federalism is rooted in the belief that issues that are not national in scope or significance are most appropriately addressed by the level of government closest to the people." In this spirit, the EO directs agencies to consider the implications of policies that may limit the scope of or preempt states' legal authority. Preemptive action having such "federalism implications" is subject to a consultation process with the states; such actions should not create unfunded mandates for the states; and any final rule published must be accompanied by a "federalism summary impact statement."

6.11 Executive Order 13175 (Tribal Government)

EO 13175 is intended to ensure regular and meaningful consultation and collaboration with tribal officials in the development of Federal policies that have tribal implications, to strengthen the United States government-to-government relationships with Indian tribes, and to reduce the imposition of unfunded mandates upon Indian tribes. The Secretary recognizes the sovereign status and co-manager role of Indian tribes over shared Federal and tribal fishery resources. In section 302(b)(5), MSA reserves a seat on the Council for a representative of an Indian tribe with federally recognized fishing rights from California, Oregon, Washington, or Idaho.

The United States government formally recognizes the four Washington coastal tribes (Makah, Quileute, Hoh, and Quinault) that have treaty rights to fish for groundfish. In general terms, the quantification of those rights is 50 percent of the harvestable surplus of groundfish available in the tribes' usual and accustomed fishing areas (described at 50 CFR 660.324). Each of the treaty tribes has the discretion to administer its fisheries and to establish its own policies to achieve program objectives.

6.12 Executive Order 12898 (Environmental Justice)

EO 12898 obligates Federal agencies to identify and address "disproportionately high adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations in the United States" as part of any overall environmental impact analysis associated with an action. NOAA guidance NAO 216-6, at section 7.02, states that "consideration of EO 12898 should be specifically included in the NEPA documentation for decision-making purposes." Agencies should also encourage public participation, especially by affected communities, during scoping, as part of a broader strategy to address environmental justice issues. The proposed action will not result in disproportionate adverse impacts to low income and minority communities.

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APPENDICES

Appendix A. Amendment 27, excerpts of modified FMP text.

Appendix B. New management measures detailed analysis.